

## BAT (MAMMALIA: CHIROPTERA) RECORDS, EARLY COLLECTORS, AND FAUNAL LISTS FOR NORTHERN CENTRAL AMERICA

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## ABSTRACT

Forty-one species of bats from northern Central America are discussed in relation to their known distribution, some because of re-examination of historic or recent records relating to them. These species include new records for Guatemala (2), Belize (1), Honduras (11), and Nicaragua (2); range extensions in the Neotropics for six species are based on specimens from Belize (1), Honduras (4), and Nicaragua (1); and one record is deleted for Nicaragua. Additional noteworthy records are reported for 15 taxa. Previous identification, locality record, or status of certain museum specimens representing published records were re-examined, and corrections and additional information are reported for 17 species. Brief historical sketches acknowledge a number of resident and visiting naturalists who were important early contributors to our knowledge of the bat fauna of northern Central America. A checklist of 119 species from this region is documented and discussed.

## RESUMEN

En este estudio se discuten cuarenta y una especies de murciélagos conocidas en el norte de Centro América en relación a su distribución, algunas a causa del nuevo examen de los registros históricos o recientes que les concieren. Estas especies se incluyen registros nuevos para Guatemala (2), Belice (1), Honduras (11), y Nicaragua (2); las expansiones del alcance en los neotrópicos para seis especies se basan en especímenes de Belice (1), Honduras (4), and Nicaragua (1); y un registro está borrado de Nicaragua. Notables registros adicionales han sido documentados por 15 especies. La identificación anterior, la localidad de registro, o el estado de ciertos especímenes del museo en representación registros publicados que fueron reexaminados, y correcciones e información adicional se han apartado para 17 especies. Recuentos históricos breves reconocen a ciertos naturalistas residentes o extranjeros que fueron importantes contribuidores pioneros a nuestro conocimiento de la fauna de los murciélagos en el norte de Centro América. Una lista de 119 especies que habitan esta región está documentada y discutida.

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## INTRODUCTION

The northern Central American countries of Guatemala, Belize, El Salvador, Honduras, and Nicaragua encompass a diverse physiography spanning the isthmus from a dry, narrow Pacific coastal plain across a mosaic of arid to moist internal montane valleys to humid Caribbean lowlands. The topography is punctuated by uplifted landmasses and volcanic formations that extend southeastward from Chiapas to Nicaragua. The region between the Isthmus of Tehuantepec and the Nicaraguan depression has been referred to as Nuclear Central America (Schuchert, 1935). This Central American core region is of biogeographical interest because it lies between North and South America. It has a bat fauna comprised of Nearctic, Neotropical, and pan-American elements, in addition to its endemic taxa.

Efforts to document the bat fauna of the region have been especially numerous during the last 25 years. Publications on the bats of Guatemala, Belize, El Salvador, Honduras, and Nicaragua include those of Davis and Carter (1962*a*), Silva-Taboada and Koopman (1964), Starrett and de la Torre (1964), Davis et al. (1964), Jones (1964*a*), Peterson (1965), Jones (1966), Carter et al. (1966), Villa-R. (1966), Disney (1968), Rick (1968), LaVal (1969), Valdez and LaVal (1971), Jones et al. (1971), Harrison and Pendleton (1973, 1974), Jones and Bleier (1974), Kirkpatrick et al. (1975), Baker and Jones (1975), Taibel (1977), Cartwright and Kirkpatrick (1977), Quinones et al. (1978), Greenbaum and Jones (1978), Pendergast (1979), Dolan and Carter (1979), Dickerman et al. (1981), McCarthy (1982), McCarthy and Bitar (1983), Ruiz (1983), Benshoof et al. (1984), Hellebuyck et al. (1985), Hill (1985), Hoffmann et al. (1987), McCarthy and Blake (1987), McCarthy (1987), Owen et al. (1990), Marshall et al. (1991), Lee and Bradley (1992), and McCarthy et al. (in press). Jones and Owen (1986), McCarthy (1987), and Owen et al. (1991) provided checklists for Nicaragua, Belize, and El Salvador, respectively. Systematic and cytogenetic investigations on the bats of these countries have resulted in analysis of a number of genera and description of additional taxa: Davis and Carter (1964), Davis (1965, 1968, 1969, 1970*a*, 1970*b*, 1973, 1976, 1984), Pine et al. (1971), Baker and McDaniel (1972), Smith (1972), Baker et al. (1972), Pine (1972), LaVal (1973*a*, 1973*b*), Wilson (1976), Eger (1977), Bickham and Baker (1977), Davis and Carter (1978), Freeman (1981), Honeycutt et al. (1981), Koop and Baker (1983), Baker et al. (1985), Bickham (1987), Arita and Humphrey (1988), and Dolan (1989).

In preparation of a comprehensive review of the bat fauna of the Central American core region, specimens in numerous museums in North and Central America and Europe have been examined to verify identifications and data. Country records and range extensions for 18 species are herein reported in Guatemala, Belize, Honduras, and Nicaragua. We also correct identifications and errors in information associated with certain historic or recent records. Information pertaining to early collectors was gathered, and we present brief biographical sketches of these men and their activities.

## ABBREVIATIONS AND MEASUREMENTS

The following institutions house specimens referenced in this report. We also list (in parentheses) names of collectors responsible for the specimens. AMNH—American Museum of Natural History, New York (Guatemala: A. W. Anthony, T. Larson, T. J. McCarthy. Honduras: T. J. McCarthy, C. F. Underwood. Nicaragua: W. B. Richardson); ANSP—Academy of Natural Sciences of Philadelphia (Honduras: J. T. Emlen, C. B. Worth); BMNH—British Museum (Natural History), London (Guatemala: O. Salvin. Belize: R. H. L. Disney, A. M. Hutson. Honduras: B. H. Gaskell. Nicaragua: E. Belcher, W. B. Richardson); CM—The Carnegie Museum of Natural History, Pittsburgh (Guatemala:



N. A. Bitar. Belize: C. T. Agostini, E. R. Blake, T. J. McCarthy, M. Reed. El Salvador: J. G. Owens. Honduras: G. A. Cruz, E. Espinosa); FLMNH—Florida Museum of Natural History, University of Florida, Gainesville (Guatemala: H. Popenoe. Honduras: G. W. Van Hyning); FMNH—Field Museum of Natural History, Chicago (Guatemala: L. de la Torre. Belize: T. J. McCarthy. Honduras: P. O. McGrew); KU—Museum of Natural History, University of Kansas, Lawrence (Nicaragua: J. K. Jones, Jr.); MNHNG—Museo Nacional de Historia Natural Jorge A. Ibarra, Guatemala (Guatemala: unknown); MSB—Museum of Southwestern Biology, University of New Mexico, Albuquerque (Belize: J. Serach); MVZ—Museum of Vertebrate Zoology, University of California, Berkeley (Guatemala: E. J. Koford); SMNS—Staatliches Museum für Naturkunde, Stuttgart (Guatemala: F. C. Sarg); TCWC—Texas Cooperative Wildlife Collections, Texas A & M University, College Station (Guatemala: D. C. Carter, D. A. Christopher, W. B. Davis. Honduras: R. D. Bradley, D. C. Carter, J. Ensink, G. H. Jarrell, R. K. LaVal, T. E. Lee, R. D. Lord, D. L. Mankins, J. V. Mankins, T. C. Maxwell, J. R. Meyer, R. Valdez, J. T. Webb. Nicaragua: D. C. Carter, I. F. Greenbaum); TTU—The Museum, Texas Tech University, Lubbock (Guatemala: P. G. Dolan. Honduras: R. J. Baker, W. J. Bleier, I. F. Greenbaum, V. R. McDaniel, C. S. Rouk, T. L. Yates); UCLA—Department of Biology, University of California, Los Angeles (Nicaragua: O. M. Buchanan); UMMZ—Museum of Zoology, University of Michigan, Ann Arbor (Belize: O. Murie); UNAH—Museo de la Fauna, Universidad Nacional Autónoma de Honduras, Tegucigalpa (Honduras: A. Ayala, S. Flores, B. Myton, R. Sánchez, S. Thorn, M. Villeda); USAC—Colecciones Zoológicas de Referencia, Universidad de San Carlos, Guatemala (Guatemala: J. L. Darling); USNM—National Museum of Natural History, Washington (Guatemala: R. G. McLean, S. R. Ubico. Belize: E. L. Tyson. Honduras: H. W. Perry, C. H. Townsend, G. W. Van Hyning); UTACV—Collection of Vertebrates, University of Texas, Arlington (Guatemala: J. A. Campbell, P. A. Davis); WNMU—Biology Collection, Western New Mexico University, Silver City (Belize: B. J. Hayward, P. Savoie, J. Serach).

Measurements are given for species not well represented by Central American collections in museums. Cranial and forearm measurements are in millimeters; greatest length of skull, breadth across molars, and length of maxillary toothrow are alveolar; condylobasal length is from the occipital condyles to the tip of the premaxillary; the right forearm was measured when possible. All measurements were recorded to the nearest 0.05 mm; weights are in grams. Elevations near sea level are abbreviated s.l.

### SPECIES ACCOUNTS

The arrangement of species accounts and nomenclature follow Jones et al. (1988), unless otherwise stated.

#### Family Emballonuridae

##### *Saccopteryx leptura* (Schreber, 1774)

This small sac-winged bat occupies the Middle American lowlands (near sea level to 450 m) along the Pacific versant north to Chiapas and the Atlantic versant to southern Belize (McCarthy, 1987). Greenbaum and Jones (1978) reported *S. leptura* from the Pacific lowlands of Departamento de Valle, Honduras. Additional specimens (TCWC, TTU) document similar localities in Valle (11.8 km SSW San Lorenzo) and Choluteca (17.8 km S Choluteca).

Two specimens in fluid (USNM 16134) from northern Honduras were obtained by C. H. Townsend in the vicinity of Trujillo, Colón, in September 1887. One is identifiable as *Rhynchonycteris naso*, but the other represents *S. leptura*. Townsend's mammal collection was reported by True (1888), but the *R. naso* from Trujillo was the only bat listed. The specimen of *S. leptura* is the sole record for the Caribbean lowlands of Honduras.

##### *Cormura brevirostris* (Wagner, 1843)

The northernmost records of *Cormura* are from Peña Blanca and Prinzapolka on the Caribbean slope of northern Nicaragua (J. A. Allen, 1910; Sanborn, 1937). W. B. Richardson collected two specimens (AMNH) of *C. brevirostris* in the area of the mountain Peña Blanca during May 1909. Allen (1910) first reported these



as *Peropteryx canina*. Allen (1910) clearly referred to Peña Blanca as a high point in the otherwise lowland Atlantic slope of Matagalpa in northern Nicaragua. This locality was erroneously plotted by Hall (1981) in the Pacific corridor of southern Rivas. Possibly he confused the name with that of the Costa Rican town of Peñas Blancas, which straddles the Nicaraguan border. This locality also is not to be mistaken for the Peña Blanca discussed by Belt (1888).

Earlier, in 1896, Richardson collected a male specimen (BMNH) in the vicinity of San Emilio, at the southern end of Lago de Nicaragua. See discussion of this locality in the account of *Ectophylla alba*. We know of no recent records of *C. brevirostris* from Nicaragua.

*Balantiopteryx plicata* Peters, 1867

HONDURAS. Choluteca: Agua Caliente, 9.6 km NW Choluteca, 8 m, 7 males, 3 females (TCWC); 11.2 km SE San Lorenzo, 8 m, 1 female (TCWC). Francisco Morazán: Campamento El Rosario, Parque Nacional La Tigra, 1 male (UNAH). Lempira: Gracias, 820 m, 3 females (FMNH); Quebrada del Amatillo, La Virtud, 4? (UNAH). Santa Bárbara: 5 km NE Llama, 120 m, 14 males, 15 females (TCWC); Macholoa, 1 male (UNAH); Petoa, 1 male (UNAH); Santa Bárbara, 160 m, 4 males (TCWC); 22 km NNE Santa Bárbara, 4 males, 9 females (TCWC).

The distribution of *B. plicata* extends southward into Central America where it appears to be restricted to the dry western corridor from Guatemala to northwestern Costa Rica (Burt and Stirton, 1961; Jones, 1964a, 1966; Starrett and Casebeer, 1968; Dolan and Carter, 1979). Goodwin (1942a) included this emballonurid in his Honduran report without documentation. Dolan and Carter (1979) cited one specimen from Choluteca. Recently, this bat was reported again in these Pacific lowlands from Valle (Lee and Bradley, 1992). The additional localities that we report place this species in subhumid valleys of western Honduras. The specimen from Parque Nacional La Tigra was collected in dry pine habitat at an elevation around 1500 m. López F. (1981) reported this species from sea level to 1500 m in México. Diurnal roost sites in Honduras included a rock shelter, a mine tunnel, the roof of a church, and the underside of a bridge.

Family Noctilionidae

*Noctilio albiventris* Desmarest, 1818

This species has been reported from Chiapas (Polaco, 1987), Guatemala (Dolan and Carter, 1979; Dickerman et al., 1981), Honduras (Davis, 1976), and Nicaragua (Goodwin, 1942a; Davis, 1976) in northern Central America. Lee and Bradley (1992) erroneously reported specimens from Olancho, Honduras, as representing the northernmost record for *N. albiventris*.

Family Phyllostomidae

*Micronycteris brachyotis* (Dobson, 1879)

McCarthy (1987) summarized Middle American records, which included specimens from Veracruz, Oaxaca, Chiapas, northern Guatemala, southern Belize, Nicaragua, Costa Rica, and Panamá. The skin of the only specimen (AMNH) of this species from Nicaragua was reported originally as "Gen. et sp. indet." (J. A. Allen, 1910:112) from Volcán de Chinandega (=Casita), Chinandega. W. B. Richardson obtained this adult bat and prepared it as a skin with skull. Allen did not



recognize it as a *Micronycteris* without the skull. It represented the only museum specimen of *M. brachyotis* other than the holotype in Paris. Allen acknowledged the striking ochraceous coloration of the throat and chest region, which was not mentioned in the original description (Dobson, 1878*b*). Apparently, the skull was disassociated from the skin at some early date and mistakenly cataloged with a juvenile skin of *Carollia brevicauda*. Goodwin (1946) recognized the skull as that of *Micronycteris* but was apparently unaware of the confusion. We assume he reported this mismatched specimen as *M. sylvestris*, in part, because both of these species possess distinctly tri-colored dorsal fur. The holotype (BMNH) of *M. sylvestris* also was the sole specimen of that taxon known at the time, although Thomas (1896) mentioned this general similarity between *C. brevicauda* and *M. sylvestris* in his description of the latter.

Sanborn (1949) recognized the age and identification error of the mismatched skin and skull, and listed only the skull in the description of *M. platyceps*. Although Goodwin and Greenhall (1961) synonymized Sanborn's *platyceps* with *brachyotis*, no further mention has been made of the Nicaraguan specimen. The questionable skin reported by J. A. Allen (1910) was recently located by one of us (McCarthy) and rejoined with its skull.

#### *Micronycteris daviesi* (Hill, 1964)

This large, rarely collected *Micronycteris* has been reported in Central America from the Caribbean lowlands of Costa Rica (LaVal, 1977) and Panamá (Hall, 1981). In April 1967, a Texas A & M field party headed by D. C. Carter captured an individual of unknown sex in a mist net at a site 40 km E Catacamas, Olancho, Honduras. The locality is on the Río Perlas where a trail to Valencia (on the Río Patuca) crosses the river. Unfortunately, the bat chewed through a holding bag and escaped. However, it was examined and photographed by R. K. LaVal. A black and white photograph of the specimen has been published (Nowak and Paradiso, 1983:246; Nowak, 1991:276) and the original color slide is stored in the Mammal Slide Library (no. 378) of the American Society of Mammalogists.

#### *Micronycteris minuta* (Gervais, 1856)

HONDURAS. Atlántida: Lancetilla, 40 m, 4 males, 1 female (TCWC).

Valdez and LaVal (1971) reported the previous northernmost record of *M. minuta* from mesic forest (500 m) in Departamento de Matagalpa, Nicaragua. Other Central American records are from forested habitats up to 600 m in Costa Rica (Gardner et al., 1970; LaVal and Fitch, 1977) and Panamá (Handley, 1966). An additional Nicaraguan record is documented by a female specimen (UCLA) from the Caribbean drainage at Crique Lecus, 96 km (by road) NW Puerto Cabezas, Zelaya Norte, 60 m.

We anticipated the occurrence of *M. minuta* in eastern Honduras. The specimens from Lancetilla represent a significant range extension northwestward in the country. R. D. Bradley, J. Ensink, and T. E. Lee captured these small *Micronycteris* on 23 June 1983, in moist tropical forest of a botanical garden.

Selected measurements (male, female) of Honduran specimens are: greatest length of skull, 17.15, 17.2; zygomatic breadth, 8.05, 8.1; postorbital constriction, 3.9, 3.9; breadth across molars, 5.35, 5.25; length of maxillary toothrow, 6.0, 6.1; breadth across mastoids, 8.2, 8.35; length of forearm,  $\bar{x}$  = 34.0 ( $n$  = 4, 33.7–34.2), 33.9.



*Micronycteris schmidtorum* Sanborn, 1935

McCarthy (1987) summarized the Central American distribution of *M. schmidtorum* in both Pacific and Atlantic drainages. Goodwin (1942a) listed, but did not document, this species from Honduras although Sanborn (1941) had reported one specimen from Copán. Two additional specimens (TCWC) are from 9.6 km W Tela, Atlántida, and 7 km N Santa Bárbara, Santa Bárbara.

*Micronycteris sylvestris* (Thomas, 1896)

HONDURAS. Colón: Laguna Bacalar, 1 male, 5 females (BMNH).

Middle American records of *M. sylvestris* are scattered. Known localities in México are from Jalisco (Villa-R., 1956), Nayarit (Jones, 1964b), and Colima (Villa-R., 1966) along the dry Pacific coast, and from southern Veracruz (Hall and Dalquest, 1963) in the Gulf drainage. In Central America, it has been recorded from southeastern Nicaragua (Arnold et al., 1983), northwestern Costa Rica (Thomas, 1896; Davis and Carter, 1962a), and coastal Panamá (Handley, 1966).

B. H. Gaskell collected the Laguna Bacalar *M. sylvestris* on 7 October 1982. This is the only reported Honduran locality. Forearm lengths (wet) for five females averaged 41.9 (41.1–43.3); one male measured 40.4.

*Macrotus waterhousii* Gray, 1843

Guatemala was visited by several early collectors associated with the Muséum National d'Histoire Naturelle, Paris. One French expedition, which stayed from early 1865 until June 1866, was headed by M.-F. Bocourt (Stuart, 1948). Although Bocourt is remembered for his "Verapaz" collection of amphibians and reptiles, he also secured a small collection of mammals that probably originated in the vicinity of Cobán, Alta Verapaz. Four juvenile specimens of *Macrotus* were included among the few bat specimens. G. E. Dobson, while preparing his "Catalogue of the Chiroptera in the Collection of the British Museum" (1878a), examined these *Macrotus* in the Paris museum. He decided that the juveniles represented a larger-sized species of *Macrotus* characterized by having the tail vertebrae extending farther beyond the uropatagial margin and longer ears than in *M. waterhousii*, and by a different noseleaf structure. Dobson (1876) thus described *M. bocourtianus* based solely on Bocourt's specimens. A review of the pertinent literature concerning the taxonomy of *Macrotus* makes it apparent that Dobson was the only researcher to examine these specimens, although *M. bocourtianus* is now generally synonymized with *M. waterhousii* (Rehn, 1904; Anderson and Nelson, 1965). We looked for the original specimens of *M. bocourtianus* only to discover that the species was not listed by Rode (1941) or Carter and Dolan (1978) in their type catalogs. M. Trainer (personal communication) reported that these specimens could not be located in Paris, and we assume they were misplaced, damaged, or loaned long ago. Bocourt's Guatemalan specimens documented the only record of *Macrotus* in Central America.

*Lonchorhina aurita* Tomes, 1863

HONDURAS. Colón: 3.2 km SE Balfate, 1 male (USNM). Santa Bárbara: Quimistán, 170 m, 1 female (UNAH).

McCarthy (1987) suggested that the Middle American range of this distinctive leaf-nosed species extends northward from Panamá in the Caribbean lowland drainage to southeastern México. McCarthy confirmed that *Lonchorhina* reaches montane elevations, but neglected to cite a Chimaltenango record from the upper



Guatemalan piedmont (Jones, 1966). Felton (1956a) reported this species in El Salvador. The above Honduran records confirm *L. aurita* for the first time in the republic. G. W. Van Hyning obtained the Colón specimen on 14 December 1930, inside a mine tunnel, along with other specimens (FLMNH) of bats. A. Ayala obtained a female from the vicinity of Quimistán on 26 March 1974.

*Tonatia evotis* Davis and Carter, 1978

BELIZE. Cayo: Central Farm, Baking Pot, 60 m, 1 male (BMNH). Toledo: vicinity Aguacate, 40 m, 2 males, 1 female (CM); 1.2 km E Aguacate, 40 m, 2 males, 1 female (CM); 1.2 km E Aguacate, 30 m, 1 male (CM); 0.8 km NW Blue Creek, 35 m, 2 males (MBS); Crique Negro, Columbia Forest, 160 m, 1 male, 1 female (USNM); Hot Springs, 1.2 km SW Big Falls bridge, Río Grande, 20 m, 2 males (BMNH); Orange Point, s.l., 1 male (FMNH); 1.6 km NNE Salamanca Camp, Columbia Forest, 145 m, 2 males (FMNH); 2.1 km NNE Salamanca Camp, Columbia Forest, 165 m, 2 males (CM).

Sanborn (1941) first reported *Tonatia* from areas north of Panamá based on a specimen (CM) from British Honduras (=Belize). It was identified as *T. amblyotis* (=silvicola) and reported as small for this species. Goodwin (1942b) also commented on the overall size of this specimen. Additional material allowed Davis and Carter (1978) to review the *T. silvicola* complex in the northern part of its range. In that paper, they described *T. evotis*, based primarily on smaller size, but did not examine the Belizean specimen. Belize is situated in the Gulf-Caribbean distribution of this large-eared species, which extends from southern Veracruz, Tabasco, Chiapas, southern Campeche, southern Quintana Roo, and El Petén, to Belize, and continues southward in eastern Guatemala and northern Honduras (McCarthy, 1987).

During early 1935, the first biological expedition to the basin and range of the Cockscomb Mountains and adjacent coastal region of Belize was undertaken by E. R. Blake and C. T. Agostini. Although the collecting effort was primarily ornithological, reptiles and mammals were also obtained. The male *T. evotis* reported by Sanborn (1941) was collected on 15 May at Freetown (=Sittee Village), Stann Creek District, and was taken from a house according to the original field catalog. The testes are enlarged and scrotal in the fluid-preserved specimen. Compared with the Belizean specimens reported here, the specimen from Freetown is a smaller individual. Selected measurements given for the Freetown male followed by the mean and range of ten males, unless otherwise stated, in parentheses: greatest length of skull, 24.1 (25.0,  $n = 9$ , 24.1–25.9); zygomatic breadth, 11.9 (12.3, 11.9–13.1); postorbital constriction, 3.8 (4.0, 3.8–4.2); breadth across molars, 7.55 (8.0, 7.55–8.3); length of maxillary toothrow, 8.1 (8.5, 8.0–9.1); length of mandible, 16.0 (16.0, 15.35–16.5); forearm length, 50.8 (51.3,  $n = 14$ , 50.2–54.0).

Four of five *Tonatia* were captured (28 April) from an inactive termite nest, located about three meters above ground in a tree, in Toledo District (A. M. Hutson, personal communication).

The absence of light postauricular patches as a character that separates *T. evotis* from *T. silvicola centralis* (Davis and Carter, 1978) appears to be a matter of degree. We examined both holotypes and found that the holotype of *T. silvicola centralis* (TCWC 18774) has more extensive whitish frosting on the dorsum, including the bases of the ears, as the hair tips are longer and lighter than on *T. evotis* (TCWC 17142). A fringe of white hairs near the posterior base of the ears



in *T. evotis* and *T. silvicola centralis* continues to the inside edge of the pinnae. These fringes appear as postauricular patches, being more extensive in *T. silvicola centralis*. The frosting of the ventral fur is extensive in *T. silvicola centralis* with a pure white portion on the throat and chest. The venter in *T. evotis* is only lightly frosted except for a similar, but not as pronounced, whitening in the throat and chest region. The lighter coloration in the postauricular regions and extent of white coloration on the venter and dorsum in *T. evotis* compare favorably with this condition in specimens of *T. silvicola silvicola* from Amazonian Perú (Loreto; TCWC 11700–11701).

Misidentifications of specimens of *T. bidens* with those of the *T. silvicola* complex have been found in museum collections (McCarthy, personal observation). We offer some morphological characters that work well to separate *T. bidens* from *T. evotis* and *T. silvicola centralis*. When viewed posteriorly, the basisphenoid foramina of each taxon is distinctive. The opening is decidedly arched and rounded on *T. evotis*, whereas it is narrow and expanded laterally, although not equally, on *T. bidens* (<1.0) and *T. silvicola centralis* (>1.0). The following structures are more pronounced in *T. bidens*: interpremaxillary foramen is enlarged and obvious anterior to larger palatal foramina; posterior nasal region is more emarginated; basisphenoid pits are relatively deeper with a higher septum; occlusal surface areas of the lower incisors are greater. The first lower premolar on *T. bidens* is symmetrically positioned in the toothrow rather than more labially positioned as in the other *Tonatia*; the occlusal surface of the first lower molar on *T. bidens* appears squarish; upper inner incisors in *T. bidens* are not procumbent and their inside edges are not in contact along the lower two-fifths of their length. Comparatively, the presence of facial hair and a fringe of hair on the inside edges of the ears are more pronounced in *T. bidens*. In northern Central America, white-tipped hairs form a short stripe in *T. bidens* from between the ears on the top of the head to the back of the head that is not found on its congeners.

*Mimon cozumelae* Goldman, 1914

McCarthy (1987) summarized the Middle American range of this spear-nosed species as extending from northern Oaxaca and southern Veracruz southeastward along the eastern lowlands of Central America. Although 13 localities were reported for *M. cozumelae* in Belize (McCarthy, 1987), only singular localities document it in Guatemala, Honduras, Costa Rica, and Panamá. Additional records for Guatemala and Honduras confirm this Caribbean lowland distribution. Winkelmann (1962), Rick (1968), and McCarthy (1982) reported specimens from Parque Nacional Tikal, El Petén, Guatemala. Three additional Guatemalan specimens include a female (CM) from a cave on Finca Ixobel, south of Poptún, southeastern El Petén, and two individuals (AMNH) from Santo Tomás de Castilla, Izabal. The only Honduran record (Valdez and LaVal, 1971) is from Lancetilla, Atlántida. Further records from Honduras are documented by two specimens (BMNH) from Aguacates, Colón, and four specimens (TCWC) from 40 km E Catacamas, Olancho. There are no records of this species from Nicaragua.

*Mimon crenulatum* (É. Geoffroy St.-Hilaire, 1810)

HONDURAS. Olancho: 40 km E Catacamas, 500 m, 1 female (TCWC).

Our female was mist-netted on 15 April 1967 by D. C. Carter, R. K. LaVal, and J. T. Webb. It was pregnant with one fetus (crown–rump length, 26). This is the only Honduran record of this species, which has a Middle American range



restricted to the Gulf–Caribbean drainages of Chiapas, Campeche, Guatemala, Belize, Nicaragua, Costa Rica, and Panamá (McCarthy, 1987).

Selected measurements are: greatest length of skull, 23.0; zygomatic breadth, 12.5; postorbital constriction, 4.3; breadth across molars, 8.85; length of maxillary toothrow, 7.85; breadth across mastoids, 11.8; length of forearm, 51.1 (dry).

*Phyllostomus hastatus* (Pallas, 1767)

BELIZE. Toledo: near Blue Creek, 35 m, 1 female (WNMU). HONDURAS. Atlántida: Lancetilla, 40 m, 6 males (TCWC), 1 female (UNAH); 14.5 km SW Tela, 30 m, 1 female (TCWC). Colón: Sico, 3 males (BMNH). Cortés: 2 km W La Lima, 40 m, 1 male (TCWC); Omoa, s.l., 1 male (AMNH); 3.2 km W San Pedro Sula, 1 male (TCWC); 3.2 km S San Pedro Sula, 30 m, 1 female (TCWC); 17.6 km S San Pedro Sula, 2 males (TCWC); 9.6 km E San Pedro Sula, 30 m, 2 females (TCWC). Olancho: 6 km SE Catacamas, 1 male (TTU); 19.4 km SSW Dulce Nombre de Culmi, 2 males, 1 female (TTU). Santa Bárbara: Ilama, 120 m, 1 female (TCWC).

Until recently, the sole Honduran record of this large species was based on a male (USNM) that was collected (16 November 1891) by H. W. Perry at Patuca (=Río Patuca, Gracias a Dios; Goodwin, 1942a) in northeastern Honduras. This locality was erroneously reported as in Nicaragua by Lee and Bradley (1992). Eastern Honduras represented the northwestern limit of the distribution for *P. hastatus*, which is well documented from Nicaragua, Costa Rica, and Panamá (Hall, 1981). Marshall et al. (1991) extended its range to eastern Guatemala in the Sierra del Merendón along the Honduran border. Additional specimens from eastern Honduras were collected in Olancho (Lee and Bradley, 1992).

The specimen collected in forest understory near Blue Creek, Belize, on 18 August 1985 by B. J. Hayward, P. Savoie, and J. Serach represents a range expansion north of the Sierra del Merendón and a country record. We document 26 specimens from 13 additional Honduran localities including two localities near the Guatemalan border in northwestern Honduras. McCarthy netted the specimen from Omoa inside a vaulted room of the Spanish coastal fortress of San Francisco de Omoa on 6 August 1988; R. K. LaVal captured a female inside a church bell tower in Santa Bárbara on 30 March 1967. The majority of the Honduran specimens were captured in mist nets. J. V. Mankins shot this species as they roosted inside hollow trunks of cottonwood trees (*Ceiba*) in Departamento de Cortés.

Selected measurements for the female from Belize and the averages (and ranges) for both sexes (ten males, five females) from Honduras are: greatest length of skull, 37.9, 40.4 (39.75–40.9), 39.1 (38.6–39.9); zygomatic breadth, 21.15, 22.6 (21.95–22.95), 21.8 (21.35–21.9); postorbital constriction, 7.2, 7.5 (7.2–7.8), 7.4 (7.2–7.6); breadth across molars, 13.75, 14.2 (13.7–14.55), 13.8 (13.5–14.15); length of maxillary toothrow, 13.4, 14.0 (13.6–14.2), 13.5 (13.15–13.75); breadth across mastoids, 19.15, 21.3 (20.2–21.85), 20.1 (19.85–20.7); length of forearm, 89.0, 93.5 (90.4–96.8), 91.3 (89.9–92.9). Available weights for nine males and four females from Honduras averaged 127.8 (100.0–142.4) and 107.6 (102.5–117.6) respectively.

*Vampyrum spectrum* (Linnaeus, 1758)

GUATEMALA. Uncertain locality, 1 male (MNHNG). El Petén: Parque Nacional Tikal, 1 female (USNM). HONDURAS. Gracias a Dios: Río Patuca delta, 1 female (TCWC). Olancho: near Río Talgua, east of Catacamas, 1 female (UNAH);



40 km E Catacamas, 500 m, 1 female (TCWC); 16.5 km (by road) SSW Dulce Nombre de Culmi, 1 female (TTU).

This largest of Neotropical bats has been reported from southern Veracruz, northern Guatemala, southern Belize, northwestern Nicaragua, and southeastward into South America (McCarthy, 1987). Dobson (1878a) listed Guatemala as part of the Central American distribution of this bat, but his report was undocumented by specimens. Alston (1879–82) stated that Dobson claimed he had seen specimens from Guatemala, although Alston knew none was obtained by O. Salvin. The first undoubted Guatemalan record of *Vampyrum* came from the Caribbean lowland in Parque Nacional Tikal, El Petén, where five individuals were identified by sight and photographed (McCarthy, 1987). A female (USNM) from Tikal was obtained by R. G. McLean and S. R. Ubico on 20 May 1984. We were told (G. Ibarra, personal communication) that the *Vampyrum* specimen on exhibit in the Museo Nacional de Historia Natural was obtained over 20 years ago in Departamento de Guatemala near the Puente de las Vacas, approximately 1500 m. We remain uncertain of this locality as no written documentation is associated with this specimen. If accurate, this would represent a rare montane record. Recently, *Vampyrum* was reported from northwestern Honduras (Lee and Bradley, 1992). The additional records reported here document its occurrence in Caribbean lowland habitats of Honduras. A dried carcass (UNAH) was found hanging from a barbed wire fence.

Selected measurements for two females from Honduras are: greatest length of skull, 51.9, 48.8; zygomatic breadth, 24.65, 23.25; postorbital constriction, 7.55, 7.65; breadth across molars, 14.95, 14.8; length of maxillary toothrow, 20.45, 19.55; mastoidal breadth, 22.4, 21.45. Forearms of four females measured 103.8 (wet), 108.4, 106.6, and 107.4.

A specimen supposedly acquired in Nicaragua during the expedition of the H.M.S. Sulphur (Gray, 1844) was cited by Dobson (1878a) and Alston (1879–82). Gray's (1844:19) zoological report of the expedition had an account of *Phyllostomus hastatus* from "Realejo." El Realejo is an old Pacific port in northwestern Nicaragua, near present-day Corinto, where Captain E. Belcher and the Sulphur secured provisions in early April 1837, and mid-November 1838 (Belcher, 1843). Dobson (1878a) reported the "Realejo" specimen as *Vampyrum*. Alston (1879–82) cited Dobson in his *Vampyrum* account. We examined the registers and collection of the British Museum, but found no specimen of *V. spectrum* from Nicaragua. The only documented record of *Vampyrum* in Nicaragua is that of an adult male from the vague locality "Volcán de Chinandega" (=Casita), obtained by W. B. Richardson on 23 August 1908 (J. A. Allen, 1910).

#### *Leptonycteris* Lydekker, 1891

Until recently, our taxonomic understanding of *Leptonycteris* was confused. A morphometric analysis (Arita and Humphrey, 1988) revised the systematics of the genus and reviewed the nomenclatural history. Two species, *L. nivalis* (Saunders) and *L. curasoae* Miller represent the genus. The range of monotypic *L. nivalis* extends from the extreme southwestern United States to south-central México, mostly at higher elevations between 1000 and 2200 m. Similarly, *L. curasoae yerbabuenae* Martínez and Villa extends from southern Arizona and New Mexico and Tamaulipas in northeastern México to southern México and northern Central America primarily at elevations below 1800 m (Arita, 1991). In northern Central America, *L. curasoae yerbabuenae* has been reported from the



dry Pacific versant of El Salvador and Honduras (Jones and Bleier, 1974; Lee and Bradley, 1992) and from rain-shadow valleys of western Guatemala (Arita and Humphrey, 1988).

Two historical specimens (BMNH) were reported by Dobson (1878*a*) as *L. nivalis* from Departamento de Sacatepéquez, Guatemala, where they were obtained by O. Salvin at San Miguel Dueñas (BMNH 1865.5.18.70) and Ciudad Vieja (BMNH 1875.2.27.38). These specimens were not examined by Hoffmeister (1957), Davis and Carter (1962*b*), Jones (1966), or Arita and Humphrey (1988). In view of the revised range for *L. nivalis* by Arita and Humphrey (1988), the identity of these specimens is in question.

Hill examined these for Hall (1981) using Hall's key. At that time, he decided that these best represent *L. nivalis*. Dobson (1878*a*) examined the specimens early in their preserved state and listed BMNH 1875.2.27.28 as immature and BMNH 1865.5.18.70 as an adult. We assume Dobson examined and measured the latter bat for his descriptive summary. Dobson stated that the interfemoral membrane was narrow and covered with fine hairs. He made no mention of a distinct uropatagial fringe. These specimens pose a problem because of the length of time they have been stored in alcohol.

Hill recently re-examined these specimens. Specimen BMNH 1865.5.18.70 is a male, but BMNH 1875.2.27.38 has been dissected and it is now difficult to determine its sex. The latter appears to be adult rather than immature as the manal epiphyses are fused. Specimen BMNH 1865.5.18.70 has a moderately developed interfemoral membrane, which in BMNH 1875.2.27.38 is a little wider; in neither is there more than a poorly developed fringe consisting of scattered hairs. This may reflect poor preservation. The skulls remain intact and were not removed due to possible decalcification over time. Relevant external measurements were compared with those in Arita and Humphrey (1988). Specimen BMNH 1865.5.18.70 was measured by P. D. Jenkins, whereas BMNH 1875.2.27.38 was measured both by Hill and by Jenkins. Measurements of BMNH 1865.5.18.70 are: length of forearm, 58.0; length of III metacarpal, 51.2; length of III first phalanx, 16.5; length of III second phalanx, 25.3; length of III third phalanx, 13.2; total III digit length, 106.2. Independent measurements of BMNH 1875.2.27.38 are: length of forearm, 54.2, 54.0; length of III metacarpal, 51.1, 50.5; length of III first phalanx, 14.3, 13.9; length of III second phalanx, 24.5, 24.4; length of III third phalanx, 13.1, 12.4; total III digit length, 103.1, 101.2. When compared with the means and ranges of variation in samples presented by Arita and Humphrey (1988), size alone supports the identification of BMNH 1865.5.18.70 as *L. nivalis*. Measurement of the third finger is variable. The terminal III phalanx is especially difficult to measure as expressed in the two independent measurements taken for BMNH 1875.2.27.38. Dobson (1878*a*:506) reported his measurement of the third phalanx, apparently of BMNH 1865.5.18.70, as "3rd ph. 0".55," which we interpret as 55 one-hundredths of one inch. If this is so, this equals approximately 14 mm although Dobson's method of measurement is not known. The direct measurements identify BMNH 1865.5.18.70 as *L. nivalis*. We consider the smaller specimen (BMNH 1875.2.27.38) to be *L. curasoeae yerbabuena*.

*Anoura geoffroyi* Gray, 1838

HONDURAS. El Paraíso: Yuscaran, Montaña Monserrat, 1000 m, 1 male (CM). Francisco Morazán: 16 km NE Talanga, 1115 m, 1 male (TCWC); 19.2 km N Tegucigalpa, 920 m, 7 males (TCWC). Intibucá: La Esperanza, 1660 m, 1



male, 4 females (TCWC). Ocotepeque: 1 km W Nueva Ocotepeque, 840 m, 2 males, 1 female (TCWC). Olancho: 3.5 km E, 3.8 SE Catacamas, 1 female (TCWC); 6 km SE Catacamas, 420 m, 5 males (TTU); 3.8 km SW Dulce Nombre de Culmi, 1 female (TCWC); 16.5 km (by road) SSW Dulce Nombre de Culmi, 450, 1 male (TTU); 6.4 km (by road) S Juticalpa, 4000 m, 1 male (TTU).

This montane and premontane nectar-feeding species apparently has not been reported from Honduras although Goodwin (1942a) included *Anoura* in his Honduran list. Its distribution complements the mountainous regions from western (Sinaloa) and eastern (Tamaulipas) México southeastward throughout Central America (Hall, 1981). Our records from eastern Olancho represent the lowest reported elevations for Central America.

*Lichonycteris obscura* Thomas, 1895

HONDURAS: Olancho: 16.5 km (by road) SSW Dulce Nombre de Culmi, 2 females (TTU).

These two specimens from Olancho were mist-netted by R. J. Baker and W. J. Bleier on 20 and 22 July 1971, and represent the first Honduran record of this nectar-feeding bat. Central American records of *Lichonycteris* are scattered from southern Belize (Hill, 1985) and eastern Guatemala (Carter et al., 1966), to Nicaragua (Jones et al., 1971), Costa Rica (Gardner et al., 1970; LaVal, 1977), and Panamá (Handley, 1966).

Selected measurements (one female) are: greatest length of skull, 19.65; zygomatic breadth, 8.55; postorbital constriction, 3.9; breadth across molars, 4.5; length of maxillary toothrow, 6.35; breadth across mastoids, 8.35; forearm length ( $n = 2$  females), 32.6, 31.9.

*Hylonycteris underwoodi* Thomas, 1903

NICARAGUA. Río San Juan: El Castillo, 40 m, 1 female (TCWC); 1 km S El Castillo, 130 m, 2 females (TCWC).

The range of *H. underwoodi underwoodi* includes the Gulf drainage of México (Veracruz, Oaxaca, Tabasco, Chiapas), the Caribbean lowlands of southern Belize and Guatemala, and the mesic coastal regions of Costa Rica and western Panamá (Jones and Holman, 1974; McCarthy and Blake, 1987). Reported elevations range from near sea level to below 2640 m. These three Nicaraguan specimens were collected on 9, 10, and 15 May 1967 by D. C. Carter, and document *Hylonycteris* for the first time in the country.

Averages and ranges of selected measurements of the three females are: greatest length of skull, 22.2 (21.8–22.7); breadth across jugals, 8.6 (8.45–8.65); postorbital constriction, 4.0 (3.9–4.05); breadth across molars, 4.5 (4.35–4.75); length of maxillary toothrow, 7.6 (7.4–7.9); breadth across mastoids, 8.5 (8.35–8.7); forearm length, 32.5 (32.35–32.75).

The sole published Guatemalan record of this bat is from Departamento de Izabal (Carter et al., 1966). Additional specimens provide records in the Sierra de las Minas [11 km N Santa Cruz, Zacapa (MVZ); near Purulhá, Baja Verapaz (UTACV)] and eastern lowlands [Finca La Unión, about 25 km E Poptún, El Petén (USNM)].

*Carollia brevicauda* (Schinz, 1821)

Hahn (1907) reported one specimen (USNM) from eastern Honduras as *Hemiderma subrufum*. This adult fluid-preserved specimen with skull extracted was



collected by H. W. Perry on 9 May 1891, on the Río Patuca, Gracias a Dios. Pine (1972) did not mention this specimen in his revision of *Carollia*. We refer the Patuca specimen to *C. brevicauda* as the dorsal pelage is long and individual hairs have distinct bands of contrasting coloration; the proximal portion of the forearm is hairy; the greatest length of the skull is 22.3; and the length of forearm is 39.8. Goodwin (1942a) reported specimens of *C. subrufa* from Muya (=Muye), La Paz, which actually are *C. brevicauda*. Similarly, Guatemalan specimens (AMNH) of *Carollia* from Alta Verapaz (Goodwin, 1955) and Izabal (Goodwin, 1934), which were identified as *C. subrufa*, are *C. brevicauda*.

*Carollia castanea* H. Allen, 1890

HONDURAS. Copán: Ruinas de Copán, 660 m, 1 male (TCWC).

Pine (1972) reported the northernmost record of this small *Carollia* from Lancetilla, Atlántida, Honduras. Dillard Carter mist-netted the specimen from Copán on 5 March 1967, which marginally extends the range of the species near the Guatemalan border.

Goodwin (1942a) incorrectly reported *C. castanea* in the basin of Sabana Grande, where C. F. Underwood actually obtained specimens of *C. subrufa* from La Piedra de Jesús. Pine (1972) reported these same specimens as *C. brevicauda*.

*Vampyressa macconnelli* (Thomas, 1901)

NICARAGUA. Zelaya Sur: 4.5 km NW Rama, 100 m, 1 male (TCWC).

We are aware of three records for this small fruit-eating species from Central American moist tropical forest. Handley (1966) reported *V. macconnelli* from near sea level and at about 590 m in Darién and Bocas del Toro, Panamá, and Starrett and Casebeer (1968) reported it from 1116 m in Cartago, Costa Rica. I. F. Greenbaum mist-netted the Zelaya specimen on 25 May 1978, which extends the known range of this species and is the first Nicaraguan record.

Selected measurements are: greatest length of skull, 18.35; zygomatic breadth, 10.45; postorbital constriction, 4.55; breadth across molars, 7.1; length of maxillary tooththrow, 5.85; breadth across mastoids, 9.0; length of forearm, 32.25; weight, 5.0.

*Uroderma magnirostrum* Davis, 1968

GUATEMALA. Santa Rosa: 10 km S, 14 km E Chiquimulilla, Río Margarita, 700 m, 1 female (TTU).

In Central America, *U. magnirostrum* appears to be restricted to dry Pacific lowlands in El Salvador, Honduras, Nicaragua, and Panamá (Davis, 1968; Jones et al., 1971). Its range continues northward along the coastal plain to Guerrero (Ramírez-P. and López-F., 1979). P. G. Dolan mist-netted the pregnant female from Santa Rosa on 15 July 1977. This specimen confirms the occurrence of this species in Guatemala.

Selected measurements are: greatest length of skull, 23.85; zygomatic breadth, 13.55; postorbital constriction, 5.8; breadth across molars, 9.55; length of maxillary tooththrow, 8.1; breadth across mastoids, 11.5; forearm length, 45.6 (dry).

*Artibeus intermedius* J. A. Allen, 1897

G. G. Goodwin reported specimens identified as *Artibeus jamaicensis* from Panajachel, Sololá, Guatemala (Goodwin, 1934), and from La Flor Archaga, Francisco Morazán, Honduras (Goodwin, 1942a). These specimens (AMNH)



were re-examined and fit the description (J. A. Allen, 1897; Davis, 1984) of *A. intermedius*.

*Ectophylla alba* H. Allen, 1892

This Central American endemic is documented along the Caribbean corridor from eastern Honduras to western Panamá (Timm, 1982; Benshoof et al., 1984). The range of the white bat extends from near sea level to above 730 m in primary forest where it is associated with *Heliconia* stands, which it utilizes as diurnal roosting sites.

The description of *E. alba* was based on a fluid-preserved specimen without a skull, which was obtained by C. H. Townsend and "believed to be from the vicinity of the Segovia River [=Río Coco], Eastern Honduras" (H. Allen, 1892: 441). Miller and Kellogg (1955) restricted the type locality to Departamento de Comarca de El Cabo (=Zelaya Norte), northern Nicaragua. This emendation has been accepted since without question (Timm, 1982; Jones et al., 1988).

*Ectophylla alba* was included in a preliminary checklist of Nicaraguan mammals (J. A. Allen, 1910:91) based on specimens from the "Segovia River." Allen, in the same paper, quoted from correspondence with C. H. Townsend about his travels in Honduras including his visit to the Río Segovia (=Río Coco). In a footnote, Allen made a puzzling error and placed Townsend in Nicaragua. We examined Townsend's original handwritten letter to Allen, dated 11 April 1910, and found that Allen misinterpreted Townsend's original comment that "all collecting done at Truxillo [=Trujillo] on the N. coast was within a few miles of the town." J. A. Allen (1910:90) apparently assumed that "N." referred to "Nicaragua." Allen reported that Townsend's field work along the Río Coco was restricted to open pine habitat adjacent to "jungle" vegetation along the river and above an apparent locality referred to as "Soohee" (or possibly Hoohee). Neither Ridgeway (1888) nor True (1888) mentioned that Townsend travelled to the Nicaraguan side of the Río Coco and considered all of his specimens Honduran. Stone (1932:293) also communicated with Townsend and stated that Townsend "did most of his work in the low country adjacent to it [the river], not penetrating far into the pinelands above." J. A. Allen (1910:112) contradicted himself by listing the general type locality for *Ectophylla alba* as "from Segovia River, Honduras."

We are unaware of whether information about the Townsend fieldwork influenced Miller and Kellogg (1955) to change the type locality for this species. One strong possibility may have been their choice of political maps. We believe Miller and Kellogg (1955) recognized the international boundary claimed by Nicaragua, which incorporated both banks of the Río Coco and adjacent Honduras. Honduras disputed this claim and, in the final decision, the International Court of Justice, The Hague, on 18 November 1960, restricted the boundary between the countries as along the Río Coco (Johnson, 1964). We conclude that the type locality was originally placed correctly on the Honduran side of the Río Coco.

Several years following the publication of the original description, an additional specimen (BMNH) of *Ectophylla* was used to describe the skull and dentition (H. Allen, 1898). This bat was shot by W. B. Richardson in the vicinity of "San Emilio," which was reported as located on the southern shore of Lago de Nicaragua by H. Allen (1898). This locality was also reported by Thomas (1896). Confusion arose over the location of Richardson's collecting site when Casebeer et al. (1963) stated that "San Emilio" was actually in Costa Rica and approximately 10 km



east and 15 km south of the southeastern corner of Lago de Nicaragua. In 1963, however, it was possible that a settlement by that name no longer existed. Also, San Emilio is a fairly common name. T. R. Howell (1964; personal communication) clarified the location of this important collecting site. The majority of Richardson's birds from San Emilio are in the Field Museum of Natural History. In that collection, the locality is recognized as being on the south-central shore of Lago de Nicaragua in Departamento de Rivas. Richardson recorded "San Emilio, (Rivas)" on his bird labels. Howell also located San Emilio on an undated map published in Germany. From that map, he judged that the locality was situated in Nicaragua about 6 km east (=southeast) of Cárdenas and 4 km west (=northwest) of Orosí. Hall (1981) cited Casebeer et al. (1963) for his range map of *E. alba*. Timm (1982) acknowledged Howell (1964), plotting Richardson's locality accordingly. Recently, Timm et al. (1989) claimed this record as Costa Rican without further explanation. We accept Howell's determination.

Our re-evaluation of the preceding Townsend and Richardson localities document these old records of *Ectophylla* as from Honduras and Nicaragua, respectively. *Ectophylla alba* has been reported since from eastern Honduras (Benshoof et al., 1984) and eastern Nicaragua (Greenbaum and Jones, 1978).

#### *Chiroderma salvini* Dobson, 1878

This species has been reported from Central America in upland regions (580–1436 m) of Guatemala (Carter et al., 1966), El Salvador (Hellebuyck et al., 1985), Honduras (Sanborn, 1941; Goodwin, 1942a; Handley, 1965; Carter et al., 1966; LaVal, 1969), Costa Rica (Goodwin, 1946; Wilson 1983; Timm et al., 1989), and Panamá (Handley, 1966). The only Guatemalan record is from Villalobos, 13 km S Guatemala City (Carter et al., 1966) in the central highlands. Two further specimens (FMNH, TCWC) are from the vicinity of San Pedro Yepocapa, Chimaltenango, and from xeric habitat above the Río Salamá, 2 km SE Salamá, Baja Verapaz. A historic specimen (SMNS) apparently was obtained in 1885 from an unspecified locality in the vicinity of "Volcán de Fuego."

#### *Chiroderma villosum* Peters, 1860

HONDURAS. Atlántida: 11.2 km E La Ceiba, 30 m, 1 male, 1 female (TCWC). Choluteca; 18.4 km S Choluteca, 50 m, 1 female (TTU). Francisco Morazán: 0.5 km SE Sabana Grande, 1000 m, 1 male, 1 female (TTU). Intibucá: near Quiraguira, 1 ? (UNAH). Olancho: Dulce Nombre de Culmi, 1 ? (UNAH); 16.5 km (by road) SSE Dulce Nombre de Culmi, 1 male (TTU). Valle: 4.2 km W, 17.3 km S Jicaro Galán, 19 males, 8 females (TCWC); 16 km SSW Nacaome, 30 m, 6 males, 1 female (TTU).

This species is widespread and occurs from lowland to mid-elevational regions of southeastern México southeastward throughout Central America, although it has remained unreported from Honduras (McCarthy, 1987). Goodwin (1942a) did not list this species. The occurrence of *C. villosum* in both dry and mesic regions of Honduras is documented here by eight records.

Hellebuyck et al. (1985) first reported this species in western El Salvador. Additional specimens (TTU) from El Salvador were listed by Owen (1987) without locality data. These ten examples were obtained at a locality 4.8 km NW La Herradura, La Paz. One further La Paz record is a male (CM) from about 5 km NW San Luis Talpa.



*Enchisthenes hartii* (Thomas, 1892)

McCarthy and Bitar (1983) first reported this species in Guatemala from the central highlands, approximately 4.8 km NE Antigua Guatemala, Sacatepéquez. This montane species is restricted in Central America to the uplifted regions of Chiapas–Guatemala, El Salvador, Honduras and Costa Rica–Panamá, where the majority of specimens were obtained from localities above 1500 m (McCarthy and Bitar, 1983; Hellebuyck et al., 1985). A male specimen (USAC) was collected at about 1600 m, 2 km E, 2.3 km S Purulhá, Baja Verapaz, in the western Sierra de las Minas.

Owen (1987) analyzed the phylogenetic relationships among fruit bats of the subfamily Stenodermatinae. The smaller species of the *Artibeus* complex were recognized as a natural assemblage and placed under the available generic name *Dermanura* Gervais. Although the exact relationship of *Enchisthenes* to this *Dermanura* group remains unclear from Owen's results, he synonymized *Enchisthenes* with *Dermanura* based on his attempt to stabilize the generic allocation for this bat. Koopman (1978) previously replaced *Enchisthenes* with *Artibeus*, in which Thomas (1892) described the species. Koopman's synonymy was followed by Anderson et al. (1982) and Handley (1987), but none justified this position. At present, the more stable decision is to retain *Enchisthenes*, which has been in the literature longer than either *Artibeus* or *Dermanura*.

## Family Natalidae

*Natalus stramineus* Gray, 1838

HONDURAS. Comayagua: Comayagua, 580 m, 1 male (TCWC). Copán: 6 km ESE Copán, 900 m, 6 males, 13 females (TCWC). El Paraíso: 4.8 km S Guinope, 1280 m, 1 male (TCWC). Francisco Morazán: Valle de Angeles, 1 ? (UNAH); 9.6 km N El Zamorano, 10 males (TCWC). Islas de la Bahía: Isla de Utila, 3.2 km N Utila, 7 m, 3 males, 1 female (TCWC). La Paz: Cueva del Viejo, 3.2 km W La Paz, 545 m, 2 males, 2 females (TCWC). Olancho: 40 km E Catacamas, 500 m, 1 male (TCWC); Río Tinto, San José, 350 m, 2 males, 1 female (TCWC). Santa Bárbara: 2 km S San Nicolás, 660 m, 1 male, 10 females (TCWC); 12 km N Santa Bárbara, 1 male (TTU).

The range of the funnel-eared bat extends from northern México into South America (Jones et al., 1988). Goodwin (1942a) provided an account of *Natalus* without documentation in his report on Honduran mammals. This species evidently is uncommon in Nicaragua, Costa Rica, and Panamá (McCarthy, 1987). This does not appear to be the situation in Honduras, however, where our 11 localities represent the first published records.

## Family Vespertilionidae

*Myotis albescens* (É. Geoffroy St.-Hilaire, 1806)

GUATEMALA. Izabal: Zapotillo, 4.8 km E El Estor, 1 male (FLMNH).

LaVal (1973a; 1977), Dolan and Carter (1979), and Medellín et al. (1986) summarized the Middle American localities (Veracruz, Chiapas, Honduras, Nicaragua, Costa Rica, Panamá) for this species. The scattered records suggest that *M. albescens* occupies the moist slopes along the Gulf–Caribbean corridor and occurs at least as far north on the Pacific versant as southern Honduras (Departamento de Choluteca). The few records from north of Panamá are at lowland elevations from near sea level to 550 m. This Izabal record documents the occurrence of the species in Guatemala for the first time.



Dobson (1878a) listed *M. albescens* from Guatemala under the generic name *Vespertilio*, based on specimens (BMNH, USNM) obtained by O. Salvin at Ciudad Vieja, Sacatepéquez. This series was re-examined by Miller and Allen (1928) and found to represent *M. velifer*. Our Guatemalan specimen was mist-netted by H. Popenoe in February 1961, over a stream north of Lago Izabal. The testes were descended and enlarged with the caudal portions of the epididymides projecting into the interfemoral membrane.

We examined and measured specimens of *M. albescens* from Chiapas (TCWC, USNM), Honduras (TTU), and Nicaragua (TCWC, UMMZ) and compared their measurements with those of our Guatemalan specimen and with measurements reported by LaVal (1973a) and Jones et al. (1971). The Izabal male is large in comparison with specimens from northern Central America. Selected measurements of the Izabal male are compared with the averages (ranges in parentheses) for males, followed by those for females, from Chiapas, Honduras, and Nicaragua: greatest length of skull, 14.5, 13.7 ( $n = 3$ , 13.25–14.25), 14.4 ( $n = 3$ , 14.2–14.9); zygomatic breadth, 9.05, 8.5 ( $n = 5$ , 8.2–8.75), 8.75 ( $n = 3$ , 8.55–9.0); postorbital constriction, 3.75, 3.85 ( $n = 8$ , 3.75–4.15), 3.9 ( $n = 3$ , 3.75–3.8); breadth across molars, 5.35, 5.3 ( $n = 8$ , 5.15–5.45), 5.5 ( $n = 3$ , 5.2–5.7); length of maxillary toothrow, 5.1, 4.8 ( $n = 8$ , 4.4–4.95), 5.1 ( $n = 3$ , 4.9–5.2); breadth across mastoids, 7.15, 7.2 ( $n = 8$ , 7.0–7.4), 7.4 ( $n = 3$ , 7.3–7.65); length of forearm, 37.1 (wet), 34.4 (dry,  $n = 9$ , 33.7–35.8), 36.05 (dry,  $n = 3$ , 35.85–36.15).

The braincase of our skull is inflated and smoothly rounded. Cingula are weakly developed or lacking altogether on the cheekteeth. The number of premolars is irregular with the upper left  $P^3$  and the lower right  $P_3$  missing, whereas the lower left  $P_3$  is fused with  $P_4$ . LaVal (1973a) found only one example with a missing  $P^3$  among a sample of 60 specimens. A right upper  $P^3$  is missing in a male (TCWC 24091) from Nicaragua. Although our fluid specimen is faded, the white-tipped hairs on the dorsum are clearly evident.

#### *Myotis californicus* (Audubon and Bachman, 1842)

The only Central American specimen of *M. californicus* was mist-netted in Antigua Guatemala, Sacatepéquez, Guatemala (McCarthy and Bitar, 1983). Two additional specimens (TCWC) from 1 km NE Aguacatán, Huehuetenango, 1620 m, further document this species in the central highlands.

#### *Myotis keaysi* J. A. Allen, 1914

LaVal (1973a) based his description of the subspecies *M. keaysi pilosatibialis* on a large number of specimens from localities ranging from Tamaulipas, México, south to Venezuela and Trinidad. He selected an adult male as the holotype from a large series collected at 1 km W Talanga, Francisco Morazán, Honduras, 750 m. This remains the only reported locality for *M. keaysi* in the country. A second Honduran locality is documented by a single non-lactating female (AMNH) collected at Santo Domingo, approximately 5.5 km ESE Cuyamel, about 700 m in the Sierra de Omoa.

#### *Eptesicus fuscus* (Palisot de Beauvois, 1796)

Although the big brown bat is widespread in México (Jones et al., 1988), its abundance appears to decrease southeastwardly along the Central American isthmus. *Eptesicus fuscus* is known from higher elevations in Guatemala (Dobson, 1878a; Goodwin, 1934, 1955; Jones, 1966), Honduras (Goodwin, 1942a), El Salvador (Burt and Stirton, 1961), Costa Rica (Goodwin, 1946), and Panamá



(Handley, 1966). Two Guatemalan specimens (AMNH) are unusual in that both are from localities in the Gulf lowlands of El Petén. Goodwin (1955) reported these specimens (as *E. fuscus*) which were collected by T. Larson in 1946 from Flores and La Libertad, both below 220 m. Upon re-examination of these specimens, McCarthy found that the juvenile *Eptesicus* from Flores is *E. furinalis*. The adult specimen from La Libertad is *E. fuscus*. The smaller species *E. furinalis* is common in the lowlands of Guatemala (Rick, 1968; Davis, 1965; Dickerman et al., 1981).

*Pipistrellus subflavus* (F. Cuvier, 1832)

HONDURAS. Olancho: 16.5 km (by road) SSW Dulce Nombre de Culmi, 1 male (TTU).

The known range of *P. subflavus veraecrucis* extends from the Gulf lowlands of Veracruz (Hall, 1981) to the Caribbean lowlands of Izabal, Guatemala (Carter et al., 1966), and Atlántida, Honduras (Rinker, 1948). The specimen from Olancho extends the range of this species about 185 km ESE from Jilamo, Atlántida. W. J. Bleier captured this bat on 22 July 1971.

Selected measurements of the male from Olancho, followed by the average for three females (UMMZ) from Atlántida (in parentheses) are: greatest length of skull, 12.15 (12.3); zygomatic breadth, 7.5 (7.55,  $n = 2$ ); postorbital constriction, 3.35 (3.35); breadth across molars, 4.75 (4.85); length of maxillary toothrow, 3.7 (3.9); breadth across mastoids, 6.5 (6.6); forearm length, 31.4 (dry) (32.8, wet).

*Lasiurus intermedius* H. Allen, 1862

The distribution of this species extends southeastward from México to Guatemala, Belize, El Salvador, and Honduras (McCarthy, 1987). The only published Guatemalan record is from near Aguacatán, Huehuetenango (Carter et al., 1966). Two specimens (TCWC) from about 5 km W El Progreso, El Progreso, and in the Pacific coast at 8 km NW Puerto de San José, Escuintla, further document the distribution of *L. intermedius* in Guatemala.

Family Molossidae

*Tadarida brasiliensis* (I. Geoffroy St.-Hilaire, 1824)

HONDURAS. Francisco Morazán: Montañas de San Juancito, above Río Choluteca at San Juan de Flores, 1740 m, 2 males (ANSP). Ocotepeque: Belén Gualcho, 1 male (UNAH).

Central American records of this migratory free-tailed bat are scattered in Guatemala (Jones, 1966), Costa Rica (Goodwin, 1946; Starrett and de la Torre, 1964; Dolan and Carter, 1979), and Panamá (Handley, 1966) at relatively high elevations (>1200 m). J. T. Emlen and C. B. Worth collected the specimens from Montañas de San Juancito on 1 August 1930. The recorded elevation of approximately 1740 m places the collection site somewhere below the cloud forest level and above the pine forests on the northeastern slope of this range (Stone, 1932). M. Villeda and R. Sánchez obtained the specimen from Ocotepeque on 11 July 1975. These specimens are the first records of this species from Honduras.

Averages (and ranges) for selected cranial measurements of the three males are: greatest length of skull, 16.4 (16.1–16.8); zygomatic breadth, 9.6 (9.6–9.7); postorbital constriction, 3.7 (3.65–3.8); breadth across molars, 6.6 (6.4–6.85); length of maxillary toothrow, 5.7 (5.5–5.85); breadth across mastoids, 9.2 (9.05–9.3).



*Nyctinomops laticaudatus* (É. Geoffroy St.-Hilaire, 1805)

HONDURAS. Yoro: Río Aguán, 8 km W Yoro, 680 m, 1 female (TCWC).

This species is well documented in the lowlands of Guatemala (Alston, 1879–82; Murie, 1935; Goodwin, 1955) and Belize (Murie, 1935; Silva-Taboada and Koopman, 1964). Single lowland records have been reported from El Salvador (Felten, 1956*b*) and Nicaragua (Jones et al., 1971). Handley (1966) reported three Panamanian records. R. K. LaVal collected (18 March 1967) the specimen reported here, a pregnant female (one fetus; crown–rump length, 26), over the Río Aguán. This specimen constitutes the only record of *N. laticaudatus* for Honduras.

Jones et al. (1971) reported the only record of *N. laticaudatus* from Nicaragua. Hall (1981) mapped this record from Potosí, Chinandega, but also reported one specimen of *Eumops bonariensis* from the same locality. Jones recalled that only one molossid specimen was obtained at that site. During the late 1970s, R. M. Timm (personal communication) discovered that Jones' specimen (KU) was misidentified, and confirmed it as *E. bonariensis*. Hall (1981) incorporated this correction but failed to delete the Potosí locality for *N. laticaudatus*. Hall (1981) thus constitutes the first report of *E. bonariensis* from Nicaragua, whereas the Jones et al. (1971) report of *N. laticaudatus* is negated and the species should be removed from the Nicaraguan checklist (Jones and Owen, 1986). We follow Freeman (1981) in using *Nyctinomops* in place of *Tadarida* for the species *laticaudata*.

*Eumops hansae* Sanborn, 1932

This small mastiff bat has been reported from scattered regions in southern Brazil–eastern Bolivia, Amazonian Brazil, Venezuela–Guianas, and northern Perú (Eger, 1977; Graham and Barkley, 1984; Ochoa et al., 1988; Ibáñez and Ochoa, 1989; Brosset and Charles-Dominique, 1990). Two specimens have been documented from eastern Panamá and southern Costa Rica (Handley, 1966; Gardner et al., 1970) and Alvarez-Casteñeda and Alvarez (1991) reported this species in the coastal plain of Chiapas, México. Recently, one specimen from northwestern Honduras was erroneously reported as the northernmost record for this species (Lee and Bradley, 1992).

*Molossus aztecus* Saussure, 1860

C. F. Underwood obtained two specimens (AMNH) in March 1937, at El Manteado and Los Encuentros, La Paz, Honduras. Goodwin (1942*a*) listed El Manteado and Los Encuentros as about 6.4–8 km and 10 km, respectively, northwest of San José. These specimens were reported originally as *Molossus bondae* (Goodwin, 1942*a*). LaVal (1977) examined them and disputed Goodwin's identification, but did not offer an opinion as to their identity. The dorsal pelage of *M. rufus*, *M. pretiosus*, and *M. bondae* is short and blackish with only a slightly paler coloration, if any, basally (Dolan, 1989). One of the specimens from La Paz is in blackish-brown pelage and matches the coloration of specimens of *M. aztecus* (TCWC) from Matagalpa, Nicaragua. The second specimen is reddish-brown. Both possess basal bands of white or buffy white on the dorsal hairs. The dorsal pelage of both is longer than that of specimens (TCWC) of *M. bondae* from Gracias a Dios, Honduras.

Dolan (1989) demonstrated that in species of *Molossus*, males average larger than females in almost all measurements, and that *M. bondae* is larger than *M. aztecus*. Averages of selected measurements for the two La Paz males, *M. aztecus*, followed by those of three female *M. bondae* (in parentheses) are: greatest length



of skull, 18.35 (19.3); zygomatic breadth, 11.75 (12.4); breadth across molars, 8.0 (8.7); breadth across canines, 4.65 (4.8); length of maxillary toothrow, 6.15 (6.8); forearm length, 38.25 (44.15). The skulls of the La Paz specimens have broad rostra, and their measurements agree with those given by Dolan (1989) for two male *M. aztecus* from Matagalpa, Nicaragua. The shape of the upper middle incisors are indeterminable due to wear and damage. Dolan did not examine these specimens, nor did she recognize their upland localities, as she assigned them to *M. molossus*. Goodwin (1942a) reported El Manteado and Los Encuentros as at approximately 3000 ft in elevation. Dolan considered *M. aztecus* as a montane species, occurring above 1500 ft. We follow Dolan (1989) for the recognition of *aztecus* as a distinct species.

Dolan (1989) mistakenly reported that Murie (1935) recovered the remains of a *M. aztecus* from a falcon in Guatemala. This specimen originated from a locality in the Mountain Pine Ridge region of Belize. Dolan did not examine this Belizean specimen (UMMZ), but arbitrarily assigned it to *M. molossus* based on the general elevation of the area. McCarthy could not locate the remains of this specimen, which may have been discarded (P. Myers, personal communication).

#### THE SALVIN AND GODMAN CONNECTION AND OTHER HISTORICAL COMMENTS

The first significant collection of bats from northern Central America was amassed through the efforts of O. Salvin and F. D. Godman during their long-term study of the biology of Central America. The reports of many specialists were accumulated in 63 volumes of "Biologia Centrali-Americana," which covered the majority of known animal and plant groups. Salvin made four visits to Guatemala: December 1857–June 1858; spring 1859–April 1860; August 1861–early 1863; and mid-1873–March 1874. Godman accompanied him during his third and most extensive expedition. During these stays, various people in Guatemala were enlisted to collect and prepare biological specimens, especially ornithological material. Local collectors continued to obtain and ship specimens to England during Salvin's absence and following his last expedition (Godman, 1915; Griscom, 1932).

All of the bats in Salvin's collection were obtained in Guatemala, except for one specimen of *Artibeus jamaicensis* from Belize (McCarthy, 1987). He did not visit El Salvador, Honduras, or Nicaragua. Dobson (1878a) and Alston (1879–82) summarized data on the majority of his specimens. E. R. Alston was enlisted to complete a treatment of Central American mammals for "Biologia Centrali-Americana." An appendix to this volume consisting of additional records was near completion when Alston suddenly died in 1881. O. Thomas included further specimens to finish that account.

G. C. Champion was employed by Salvin and Godman principally to collect insects in Guatemala in the period from 1879 to 1881. Among the species included by Thomas in the Alston supplement were specimens of the bats *Diclidurus albus* and *Choeronycteris minor* collected by Champion. The latter specimen was subsequently described (Thomas, 1903) as a new species, *Choeroniscus godmani*, in honor of Godman. The BMNH registers document additional bat specimens from Champion. Original identifications in the 1881 register record specimens of *Glossophaga*, *Lasiurus*, *Rhogeessa*, *Nyctinomops*, and *Eumops* from San Jerónimo (Departamento de Baja Verapaz) and Cahabón (Departamento de Alta Verapaz).



Of these, only a specimen of *Artibeus lituratus* preserved in alcohol has been located.

Examination of the Salvin and Godman specimens in the fluid collection at the British Museum proved difficult. Few identification changes have been noted in the museum registers. For example, a specimen entered as *Rhinolophus* in 1875 may retain that identification, which does not reflect its actual identity as *Micronycteris*. Furthermore, it is possible that specimens were damaged or lost while stored in Bloomsbury before the Natural History Museum was moved to South Kensington in 1883.

Accurate accounting of the Salvin and Godman material is made difficult by the fact that some specimens may have been dispersed. As one example, R. F. Tomes obtained specimens from Salvin and Godman, which eventually were returned to the museum in 1907 when Tomes' collection was accessioned there. Salvin completed three trips to Guatemala by mid-1863, but the mammal specimens from these expeditions were not accessioned into the museum until 1865. Tomes (1861) published a list of mammals collected by Salvin at San Miguel Dueñas. There was also an exchange with G. E. Dobson in November 1875, which included two bats from the Salvin collection.

Another name associated with Guatemalan mammalogy in "Biologia Centrali-Americana" is that of F. C. Sarg. Sarg was a German immigrant whose family established a coffee plantation in the vicinity of Cobán, Alta Verapaz (Stoll, 1886). Sarg had an active interest in natural history and sold specimens to Salvin and Godman, besides providing observations on a variety of mammals. He continued to collect specimens after Alston's volume was published, two of which were the basis for the description (Thomas, 1904) of the Middle American endemic species, *Balantiopteryx io*.

Some of Sarg's mammals were deposited in Museum für Naturkunde der Humboldt, Berlin. One bat, *Diclidurus albus*, was reported (Alston, 1879–82) from the Berlin collection. A list of 13 Guatemalan bats (R. Angermann, personal communication) from the Berlin Museum included the *Diclidurus*. There is no indication that specimens in the remainder of this list were collected by Sarg. Eight of these specimens were sold to the Berlin Museum by G. Schneider, a natural history trader in Basel. Dr. Angermann pointed out that a Berlin trader, H. Rolle, handled the Sarg mammals, which appear to have represented single specimens of selected species.

McCarthy discovered Guatemalan mammals collected by Sarg in the Staatliches Museum für Naturkunde, Stuttgart. We learned that the Sarg family apparently originated somewhere in the region of Stuttgart (F. Dieterlen, personal communication), which may explain why his collection was sent there. Specimens of bats were received in Stuttgart between 1878 and 1887. McCarthy examined the collection of 30 fluid-preserved specimens, many without locality data, and identified 17 species: *Diclidurus albus*, *Noctilio leporinus*, *Pteronotus davyi*, *Micronycteris megalotis*, *Glossophaga soricina*, *Choeronycteris mexicanus*, *Sturnira lilium*, *Artibeus jamaicensis*, *Platyrrhinus helleri*, *Chiroderma salvini*, *Dermanura phaeotis*, *Centurio senex*, *Natalus stramineus*, *Myotis nigricans*, *Lasiurus blossevillii*, *Eumops auripendulus*, and *Promops centralis*.

Field collecting in Central America ended for Salvin and Godman in 1898. A. W. Anthony undertook the next significant collecting effort in Guatemala from May 1924 to October 1928. Anthony was a veteran ornithologist who sold birds



to the American Museum where L. Griscom published a distributional study of the Guatemalan fauna (Griscom, 1932). Anthony also secured a representative mammal collection for his son, H. E. Anthony, who was Curator of Mammalogy, at the same institution. Guatemalan specimens of 17 species of bats collected by Anthony were reported by Goodwin (1934).

While enroute to Guatemala, Salvin and Godman travelled to Belize City where they transferred to another ship after a few days and proceeded down the coast to Izabal. In 1862, Salvin travelled through the Petén, from Cobán to the Belize River and on to Belize. It was his intention to continue on to Izabal in order to return to the interior of Guatemala, but he was delayed because of the unavailability of a boat. To occupy this time, he explored the bird fauna of the offshore islands and reef associations (Salvin, 1864; Godman, 1915). One male bat, *Artibeus jamaicensis* (BMNH), was secured from Half Moon Caye. There are no additional bat specimens from Belize in the Salvin collections. This specimen was listed by Dobson (1878a:520) and Andersen (1908:266) as from "Honduras," although this was a term generally used in reference to the region that extends from southern Quintana Roo, México, southeastward to northern Honduras (McCarthy, 1987).

The first documentation of bats from Belize resulted from a venture by David Dyson to the British settlement in Honduras. Dyson was a young naturalist, about 21 years old, when he travelled to Belize under the sponsorship of the Thirteenth Earl of Derby, the British Museum, Hugh Cuming of London, The Zoological Society of London, and the Manchester Botanical Gardens. A letter from Dyson's brother to the Earl of Derby is in the archives of the Merseyside Museum, Liverpool. This states that Dyson left for Belize on the Tuesday before 20 September 1844. The elder Dyson notified those (subscribers) who were supporting his brother's venture of his departure and his hope for success. Dyson arrived in Belize on 3 November 1844 and made general natural history collections in the area until late 1845 (Jackson, 1908). With his field efforts, natural history studies of present-day Belize began. Among his specimens (BMNH) are the bats *Sturnira lilium* and *Rhogeessa tumida* (McCarthy, 1987). Hugh Cuming was a shell collector and an agent, who apparently bought and sold Dyson specimens, but he did not accompany Dyson to the settlement as implied by McCarthy (1987).

Godman (1915) stated that he and Salvin were not interested in conducting fieldwork or supporting collectors in El Salvador. Even during their time they considered El Salvador to be overpopulated with much of the land under cultivation. Godman failed to mention that W. B. Richardson collected birds for them in El Salvador from February to April 1891 (Dickey and Van Rossem, 1938). We know of no mammal specimens. They believed that the flora and fauna there was similar to that of nearby Guatemala and Honduras, although Richardson collected some unique bird specimens. Captain John M. Dow, who commanded the coastal steamer "Guatemala," obtained a series of *Myotis* near Volcán Izalco prior to 1860. These appear to represent the first bat specimens (ANSP) from El Salvador (Burt and Stirton, 1961).

G. F. Gaumer was a U.S. citizen and long-time resident of Izamal, Yucatán. He was an avid naturalist who made considerable collections of mammals, birds, and insects from the peninsula. Gaumer was visited briefly by Godman during the latter's field work in México in 1887 and 1888 (Godman, 1915). On behalf of Salvin and Godman, Gaumer investigated the bird faunas on the coastal islands along the Yucatán Peninsula and in the Bay of Honduras. To our knowledge, the



first reported bat specimens from Honduras were obtained by Gaumer in 1886 and 1887 on the island of Roatán (Thomas, 1888). His small collection in the British Museum included specimens of *Saccopteryx bilineata*, *Glossophaga soricina*, *Artibeus jamaicensis*, and *Molossus molossus*. Three specimens (*G. soricina* and *A. jamaicensis*) were transferred from London at an undetermined time to the Biological Museum, University of Toronto. Eventually, these were incorporated in the collections of Royal Ontario Museum at its inception in 1901 (W. Hlywka, personal communication).

It appears that Gaumer was in the Bay Islands during September 1887 when C. H. Townsend visited Roatán (Monroe, 1968). Townsend was in the joint service of the U.S. Fish Commission and the U.S. National Museum. His primary interest was to investigate the bird fauna of the Swan Islands and the Mosquitia Coast of Honduras. A substantial mammal collection was made that included the few bats mentioned in the preceding accounts, including the holotype of *Ectophylla alba*.

The first extensive mammal collection from Honduras was secured by C. F. Underwood. As a young man, Underwood left England in 1889 for Costa Rica where he was engaged in taxidermy and collecting with the Museo Nacional de Costa Rica. Bat specimens were purchased from Underwood by the British Museum in 1895. These included the holotypes of *Micronycteris sylvestris* and *Hylonycteris underwoodi* (Thomas, 1896, 1903). In early 1931, Underwood moved from Costa Rica to Honduras, where he collected birds and mammals until early 1938, when he returned to Costa Rica (Monroe, 1968). Underwood's mammal collections were purchased during this period by the American Museum. Descriptions of the bats *Phylloderma stenops septentrionalis*, *Sturnira hondurensis*, and *Eumops underwoodi* were based on Underwood specimens (Goodwin, 1940).

W. B. Richardson was the most important early mammal collector in Nicaragua. As a young man from Boston, he collected birds for Salvin and Godman in México, where he joined Godman in 1887. He continued to work for his British sponsors in Guatemala in 1889 and 1890. Richardson's Nicaraguan fieldwork was carried out at intervals after he settled in Matagalpa, Nicaragua, in 1891 to grow coffee. Bird collecting also took him to Honduras briefly. Financial support for his collecting efforts was suspended shortly before Salvin's death in 1898. Richardson approached the American Museum that same year for support to collect birds. Sporadic collections were made in the period 1904 to 1909, depending on Richardson's time and availability of funds from New York. His serious mammal collecting began in 1906 (J. A. Allen, 1908, 1910). Fieldwork by Richardson for the American Museum continued in Colombia and Ecuador (1911–13), and Panamá (1915). Richardson resumed collecting in Nicaragua during the first half of 1917 (T. R. Howell, personal communication).

Interestingly, Godman (1915) did not mention Richardson in his abbreviated account of the fieldwork undertaken in Nicaragua, although he included Charles W. Richmond. Although Richmond was not a collaborator of Salvin and Godman, he obtained a significant bird collection from the Caribbean lowlands of southeastern Nicaragua. Richmond was accompanied by his brother, W. L. Richmond, and G. E. Mitchell during the period 1 February 1892 to 19 January 1893. A description of the region, his collecting itinerary, and accounts of the birds were provided by Richmond (1893). In addition to birds, a small number of bats was deposited by Richmond in the U.S. National Museum. These included *Rhynchonycteris naso*, *Saccopteryx bilineata*, *Lichonycteris obscura*, *Myotis albescens*, *Myotis riparius*, and *Eptesicus furinalis*. An important collecting locality was the



International Planting (I. P.) Company's plantation along the Río Escondido, which was estimated to be approximately 50 mi by river west of Bluefields. Jones and Engstrom (1986) stated the I. P. plantation was located 3 km S and 13 km E Rama. G. E. Mitchell acquired three specimens of *Thyroptera discifera* there. These represent the only record of the species on the Central American isthmus. They were thought to have been captured from the undersides of dead banana leaves (Wilson, 1976). This is likely inasmuch as the I. P. was a banana plantation and Richmond (1893) mentioned that dead leaves hanging from banana plants were investigated because certain bird species frequented these sites for insects.

#### DISCUSSION

We recognize a total of 119 species of bats overall for northern Central America (Table 1). This constitutes 90% of the 132 Central American species (Jones et al., 1988) and includes eight of the nine regional families of Chiroptera. In northern Central America the insectivorous bats of the families Emballonuridae (11 species), Noctilionidae (two species), Mormoopidae (five species), Natalidae (one species), and Thyropteridae (two species) are Neotropical in affinities; only *Mormoops megalophylla* extends northward into the dry environment of northern México and southwestern United States. The distribution of the large and diverse component of 63 phyllostomid species is primarily Neotropical. Only *Macrotus waterhousii*, among the 23 animalivorous representatives of the Phyllostominae, enters the Nearctic realm. Of the 11 flower-feeding glossophagines, both species of *Leptonycteris* and *Choeronycteris mexicana* extend northward to northern México and southwestern United States. The carolliine (four species) and stenodermatine (22 species) frugivorous bats are Neotropical. The three vampire bats of the subfamily Desmodontinae have extensive Neotropical ranges. The remaining Vespertilionidae and Molossidae, like the Emballonuridae, are insectivorous and have wide distributions. Unlike the emballonurids, and molossids and, especially, the vespertilionids have successfully radiated into truly temperate environments. Consequently, some of the vespertilionids (19 species) and molossids (16 species) of northern Central America have Nearctic affinities. Among the vespertilionids, these are *Myotis auriculus*, *M. californicus*, *M. velifer*, *Pipistrellus subflavus*, *Eptesicus fuscus*, and *Lasiurus intermedius*. The molossids *Eumops glaucinus* and *E. underwoodi* have marginal Nearctic distributions. *Lasiurus blossevillii*, *L. cinereus*, *L. ega*, and *Tadarida brasiliensis* have wide ranges in North and South America that classify them as pan-American.

Ninety-four species are reported for Guatemala. We retain *Macrotis waterhousii* and *Leptonycteris nivalis* in our checklist based on the historical records of Dobson (1876, 1878a). *Myotis cobanensis* tentatively is recognized as an endemic restricted to the Sierra de la Chamá. The southern range limits for six species reach Guatemala (*Balantiopteryx io*, *M. waterhousii*, *L. nivalis*, *Myotis auriculus*, *M. californicus*, and *M. fortidens*). *Balantiopteryx io* is a regional endemic found in southeastern México, Guatemala, and Belize. The distribution of *Lasiurus cinereus* has a marked hiatus. Its range in the Northern Hemisphere apparently terminates in Guatemala, then resumes in South America along the Andean corridor and extends to the southern portion of the continent.

The Honduran checklist presently includes 98 species. The known ranges for *Micronycteris daviesi*, *M. hirsuta*, *M. minuta*, *Tonatia silvicola*, *Carollia castanea*, *Ectophylla alba*, *Myotis riparius*, and *Molossus bondae* reach their reported northern limits inside Honduras. Similarly, the southernmost localities of record for



Table 1.—Distribution of the bats of northern Central America [Guatemala (a), Belize (b), El Salvador (c), Honduras (d), and Nicaragua (e)]. Species that reach their northwesternmost (N) or southeasternmost (S) Central American limits within one of the five countries are indicated. Bats that are endemic (E) to Neotropical México and/or Central America are designated. The distribution of two endemics, *Artibeus inopinatus* and *Myotis cobanensis*, are restricted (R) to northern Central America. Disjunct distributions (D) of certain species appear to end in Central America, only to reappear in South America. Dolan (1989) and Gardner and Ferrell (1990) are followed for the changes in *Molossus* and the use of *Platyrrhinus* in place of *Vampyrops* that differ from Jones et al. (1988).

Species	Gua <sup>a</sup>	Bz <sup>b</sup>	ES <sup>c</sup>	Hon <sup>d</sup>	Nic <sup>e</sup>
<b>Emballonuridae</b>					
<i>Rhynchonycteris naso</i>	X	X	X	X	X
<i>Saccopteryx bilineata</i>	X	X	X	X	X
<i>Saccopteryx leptura</i>	X	X	X	X	X
<i>Cormura brevirostris</i>					N
<i>Peropteryx kappleri</i>	X	X		X	X
<i>Peropteryx macrotis</i>	X	X	X	X	X
<i>Centronycteris maximiliani</i>	X	X		X	
<i>Balantiopteryx io</i> (E)	S	X			X
<i>Balantiopteryx plicata</i> (E)	X		X	X	X
<i>Cyttarops alecto</i>					N
<i>Diclidurus albus</i>	X	X		X	X
<b>Noctilionidae</b>					
<i>Noctilio albiventris</i>	X			X	X
<i>Noctilio leporinus</i>	X	X	X	X	X
<b>Mormoopidae</b>					
<i>Pteronotus davyi</i>	X	X	X	X	X
<i>Pteronotus gymnonotus</i>	X		X	X	X
<i>Pteronotus parnellii</i>	X	X	X	X	X
<i>Pteronotus personatus</i>	X	X	X	X	X
<i>Mormoops megalophylla</i> (D)	X	X	X	S	
<b>Phyllostomidae</b>					
<i>Micronycteris brachyotis</i>	X	X			X
<i>Micronycteris daviesi</i>				N	
<i>Micronycteris hirsuta</i>				N	X
<i>Micronycteris megalotis</i>	X	X	X	X	X
<i>Micronycteris minuta</i>				N	X
<i>Micronycteris nicefori</i>		N			X
<i>Micronycteris schmidtorum</i>	X	X		X	X
<i>Micronycteris sylvestris</i>				X	X
<i>Macrotus waterhousii</i>	S				
<i>Lonchorhina aurita</i>	X	X	X	X	
<i>Macrophyllum macrophyllum</i>	X	X	X	X	X
<i>Tonatia bidens</i>	X	X		X	X
<i>Tonatia brasiliense</i>	X	X		X	X
<i>Tonatia evotis</i> (E)	X	X		S	
<i>Tonatia silvicola</i>				N	X
<i>Mimon cozumelae</i>	X	X		X	
<i>Mimon crenulatum</i>	X	X		X	X
<i>Phyllostomus discolor</i>	X	X	X	X	X
<i>Phyllostomus hastatus</i>	X	N		X	X
<i>Phylloderma stenops</i>	X	X		X	
<i>Trachops cirrhosus</i>	X	X	X	X	X
<i>Chrotopterus auritus</i>	X	X	X	X	X
<i>Vampyrum spectrum</i>	X	X		X	X
<i>Glossophaga commissarisi</i>	X	X	X	X	X
<i>Glossophaga leachii</i> (E)	X		X	X	X
<i>Glossophaga soricina</i>	X	X	X	X	X



Table 1.—Continued.

Species	Gua <sup>a</sup>	Bz <sup>b</sup>	ES <sup>c</sup>	Hon <sup>d</sup>	Nic <sup>e</sup>
<i>Leptonycteris curasoae</i> (D)	x		x	S	
<i>Leptonycteris nivalis</i>	S				
<i>Lonchophylla robusta</i>					N
<i>Anoura geoffroyi</i>	x		x	x	x
<i>Lichonycteris obscura</i>	x	N		x	x
<i>Hylonycteris underwoodi</i> (E)	x	x			x
<i>Choeroniscus godmani</i>	x		x	x	x
<i>Choeronycteris mexicana</i>	x			S	
<i>Carollia brevicauda</i>	x	x		x	x
<i>Carollia castanea</i>				N	x
<i>Carollia perspicillata</i>	x	x	x	x	x
<i>Carollia subrufa</i> (E)	x		x	x	x
<i>Sturnira ludovici</i>	x		x	x	x
<i>Sturnira lilium</i>	x	x	x	x	x
<i>Vampyressa macconnelli</i>					N
<i>Vampyressa nymphaea</i>					N
<i>Vampyressa pusilla</i>	x	x		x	x
<i>Uroderma bilobatum</i>	x	x	x	x	x
<i>Uroderma magnirostrum</i>	x		x	x	x
<i>Artibeus inopinatus</i> (E,R)			N	x	S
<i>Artibeus intermedius</i>	x	x	x	x	x
<i>Artibeus jamaicensis</i>	x	x	x	x	x
<i>Artibeus lituratus</i>	x	x	x	x	x
<i>Ectophylla alba</i> (E)				N	x
<i>Platyrrhinus helleri</i>	x	x	x	x	x
<i>Vampyrodes caraccioli</i>	x	x		x	x
<i>Chiroderma salvini</i>	x		x	x	
<i>Chiroderma villosum</i>	x	x	x	x	x
<i>Dermanura azteca</i> (E)	x		x	x	
<i>Dermanura phaeotis</i>	x	x	x	x	x
<i>Dermanura tolteca</i>	x	x	x	x	x
<i>Dermanura watsoni</i>	x	x		x	x
<i>Enchisthenes hartii</i>	x		x	x	
<i>Centurio senex</i>	x	x	x	x	x
<i>Desmodus rotundus</i>	x	x	x	x	x
<i>Diaemus youngi</i>			x		x
<i>Diphylla ecaudata</i>	x	x	x	x	x
Natalidae					
<i>Natalus stramineus</i>	x	x	x	x	x
Thyropteridae					
<i>Thyroptera discifera</i> (D)					N
<i>Thyroptera tricolor</i>	x	x		x	
Vespertilionidae					
<i>Myotis albescens</i>	x			x	x
<i>Myotis auriculus</i>	S				
<i>Myotis californicus</i>	S				
<i>Myotis cobanensis</i> (E)	R				
<i>Myotis elegans</i> (E)	x	x		x	x
<i>Myotis fortidens</i>	S				
<i>Myotis keaysi</i>	x	x	x	x	x
<i>Myotis nigricans</i>	x		x	x	x
<i>Myotis riparius</i>				N	x
<i>Myotis velifer</i>	x		x	S	
<i>Pipistrellus subflavus</i>	x			S	
<i>Eptesicus furinalis</i>	x	x		x	x



Table 1.—Continued.

Species	Gua <sup>a</sup>	Bz <sup>b</sup>	ES <sup>c</sup>	Hon <sup>d</sup>	Nic <sup>e</sup>
<i>Eptesicus fuscus</i>	x		x	x	
<i>Lasiurus blossevillii</i>	x	x	x	x	x
<i>Lasiurus cinereus</i> (D)	S				
<i>Lasiurus ega</i>	x	x		x	
<i>Lasiurus intermedius</i>	x	x	x	S	
<i>Rhogeessa tumida</i>	x	x	x	x	x
<i>Bauerus dubiaquercus</i> (E)	x	x		x	
Molossidae					
<i>Molossops greenhalli</i>				x	
<i>Tadarida brasiliensis</i>	x			x	
<i>Nyctinomops laticaudatus</i>	x	x	x	x	
<i>Eumops auripendulus</i>	x	x	x	x	x
<i>Eumops bonariensis</i>		x		x	x
<i>Eumops glaucinus</i>		x		x	x
<i>Eumops hansae</i>				x	
<i>Eumops underwoodi</i>		x	x	x	S
<i>Promops centralis</i>	x			x	x
<i>Molossus aztecus</i>	x			x	x
<i>Molossus bondae</i>				N	x
<i>Molossus coibensis</i>			x		
<i>Molossus molossus</i>	x	x	x	x	x
<i>Molossus pretiosus</i>					N
<i>Molossus rufus</i>	x	x	x	x	x
<i>Molossus sinaloae</i>	x	x		x	x
Totals	119	94	69	98	88

*Tonatia evotis*, *Choeronycteris mexicana*, *Myotis velifer*, *Pipistrellus subflavus*, and *Lasiurus intermedius* are Honduran. *Tonatia evotis* is a regional endemic. *Mormoops megalophylla* and *Leptonycteris curasoae* have disjunct distributions that appear to terminate in Olancho and the Pacific lowlands of Honduras, but these species also occur in northern South America.

The literature for Nicaragua documents 88 species of bats including *Cormura brevirostris*, *Cyttarops alecto*, *Lonchophylla robusta*, *Vampyressa macconnelli*, *V. nymphaea*, and *Molossus pretiosus*, which have not been recorded farther north. While these tropical species occur in Nicaragua, the temperate vespertilionid assemblage listed for Guatemala and Honduras is noticeably absent. Also missing from Nicaragua are bats (e.g., *Chiroderma salvini*, *Dermanura azteca*, *E. hartii*, *Eptesicus fuscus*, and *Lasiurus cinereus*) that inhabit higher elevations. This faunal variation reflects the low mountains in northern Nicaragua, which farther south become the lower topographic relief of the Nicaraguan depression. The latter forms a transitional area between the northern Central American block and the remainder of the isthmus. The ranges of *Artibeus inopinatus* and *Eumops underwoodi* reach southeastern limits in Nicaragua. The former is a restricted endemic of the Pacific lowlands of El Salvador, Honduras, and Nicaragua. *Thyroptera discifera* is known in Central America only from one locality in the Caribbean lowlands of Nicaragua, although it also occurs in northern South America.

The occurrence of some species in northern Central America appears to be primarily at elevations above 500 m. These bats include *Leptonycteris nivalis*, *Choeronycteris mexicana*, *Chiroderma salvini*, *Dermanura azteca*, *D. tolteca*, *Enchisthenes hartii*, *Myotis auriculus*, *M. californicus*, *M. cobanensis*, *M. velifer*,



*Eptesicus fuscus*, *Lasiurus cinereus*, *Tadarida brasiliensis*, and *Molossus aztecus*. Noticeably unreported from the mountains of northern Central America is *Eptesicus brasiliensis*, a pronounced hiatus between known localities in Chiapas and Costa Rica (Hall, 1981). The montane species *Sturnira mordax* is endemic to Costa Rica and western Panamá (Olmos and de Sousa, 1989) and not known northward. The name *ludovici* Anthony, 1924, has been applied to the remaining larger *Sturnira* of montane Middle America (de la Torre, 1961). We concur with Timm et al. (1989) that these fruit bats will probably prove to represent a composite of species and that true *S. ludovici* is an Andean endemic. Consequently, Goodwin's (1940) name *S. hondurensis* would be available for these bats in northern Central America.

Patterns of occurrence at lower elevations for some species reflect a preference for specific climatic conditions. The distributions of *Balantiopteryx plicata*, *Glossophaga leachii*, *Carollia subrufa*, *Uroderma magnirostrum*, *Artibeus inopinatus*, and *Molossus coibensis* in northern Central America are restricted to drier environments associated with the Pacific slope and dry intermontane valleys. The moisture gradient along the Caribbean and Gulf versants identifies the restricted distributions of *Centronycteris*, *Cyttarops*, *Micronycteris daviesi*, *M. nicefori*, *Tonatia bidens*, *T. evotis*, *Mimon cozumelae*, *M. crenulatum*, *Lonchophylla robusta*, *Hylonycteris*, *Carollia castanea*, *Vampyrodes*, *Vampyressa nymphaea*, *V. pusilla*, *Ectophylla*, *Dermanura watsoni*, *Thyroptera discifera*, *Myotis albescens*, *M. riparius*, *Pipistrellus*, *Bauerus*, and *Molossus bondae*.

The bat faunas of the coastal countries of El Salvador (58) and Belize (69) are characterized by species indicative of the dry Pacific coastal region in the former and wet Caribbean lowlands of the latter. The limited montane habitats in El Salvador support additional species such as *Sturnira ludovici*, *Dermanura azteca*, *Enchisthenes hartii*, and *Myotis velifer*, which increase species composition. Upland regions in Belize are not as elevated and the known fauna lacks montane species and is limited to *Dermanura tolteca*, a species of intermediate elevation. The northernmost neotropical localities for *Micronycteris nicefori*, *Phyllostomus hastatus*, and *Lichonycteris obscura* are in southern Belize.

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## GAZETTEER

Localities mentioned in the text from Guatemala, Belize, El Salvador, Honduras, Nicaragua, and Costa Rica are listed alphabetically under departments, districts, or provinces. The number for each locality corresponds with the number on the accompanying map (Fig. 1).

## GUATEMALA

## Alta Verapaz

- 1) Cahabón 15°34'N/89°49'W  
2) Cobán 15°29'N/90°19'W

## Baja Verapaz

- 3) Purulhá 15°16'N/90°12'W  
4) Salamá 15°06'N/90°16'W  
5) San Jerónimo 15°03'N/90°12'W

## Chimaltenango

- 6) San Pedro Yepocapa 14°30'N/90°57'W

## El Petén

- 7) Flores 16°56'N/89°53'W  
8) La Libertad 14°37'N/91°42'W  
9) Poptún 16°21'N/89°26'W  
10) Parque Nacional Tikal 17°20'N/89°39'W

## El Progreso

- 11) El Progreso 14°51'N/90°04'W

## Escuintla

- 12) Puerto de San José 13°55'N/90°49'W

## Guatemala

- 13) Amatítlan 14°29'N/90°37'W  
14) Guatemala 14°38'N/90°31'W

## Huehuetenango

- 15) Aguacatán 15°21'N/91°18'W

## Izabal

- 16) El Estor 15°32'N/89°21'W  
17) Santo Tomás de Castilla 15°42'N/88°37'W

## Quiché

- 18) Sacapulas 15°20'N/91°04'W

## Sacatepéquez

- 19) Antigua Guatemala 14°34'N/90°44'W  
20) Ciudad Vieja 14°31'N/90°46'W  
21) San Miguel Dueñas 14°31'N/90°48'W

## Santa Rosa

- 22) Chiquimulilla 14°05'N/90°23'W

## Sololá

- 23) Panajachel 14°44'N/91°09'W

## Zacapa

- 24) Santa Cruz 15°01'N/89°39'W

## Unspecified locality

- 25) "Volcán de Fuego" 14°29'N/90°53'W

## BELIZE

## Belize

- 26) Half-Moon Caye 17°12'N/87°32'W

## Cayo

- 27) Central Farm, Baking Pot 17°11'N/89°00'W  
28) Mountain Pine Ridge 16°53'N/88°55'W

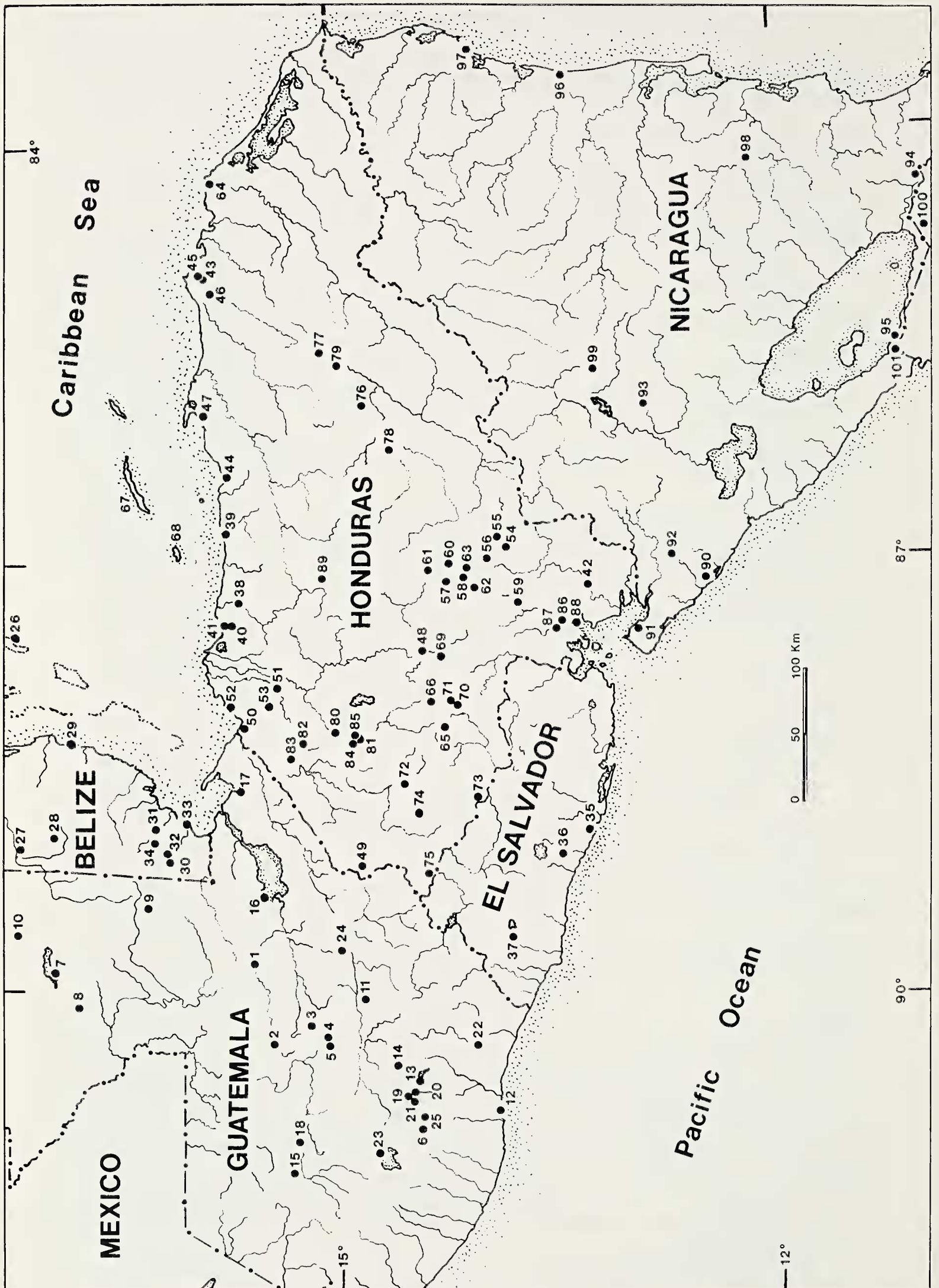
## Stann Creek

- 29) Sittee (=Freetown) 16°50'N/88°17'W

## Toledo

- 30) Aguacate 16°10'N/89°06'W  
31) Big Falls 16°19'N/88°51'W  
32) Blue Creek 16°12'N/89°03'W  
33) Orange Point 16°04'N/88°49'W  
34) Salamanca (Forestry Camp) 16°16'N/89°01'W







**EL SALVADOR**

## La Paz

- 35) La Herradura 13°21'N/88°58'W  
 36) San Luis Talpa 13°29'N/89°06'W

## Sonsonate

- 37) Volcán Izalco 13°49'N/89°38'W

**HONDURAS**

## Atlántida

- 38) Jilamo 15°35'N/87°21'W  
 39) La Ceiba 15°47'N/86°50'W  
 40) Lancetilla 15°42'N/87°28'W  
 41) Tela 15°43'N/87°29'W

## Choluteca

- 42) Choluteca 13°08'N/87°12'W

## Colón

- 43) Aguacates 15°55'N/85°04'W  
 44) Balfate 15°48'N/86°25'W  
 45) Laguna Bacalar 15°57'N/85°01'W  
 46) Sico 15°50'N/85°10'W  
 47) Trujillo 15°55'N/86°00'W

## Comayagua

- 48) Comayagua 14°25'N/87°38'W

## Copán

- 49) Copán 14°50'N/89°09'W

## Cortés

- 50) Cuyamel 15°38'N/88°12'W  
 51) La Lima 15°24'N/87°56'W  
 52) Omoa 15°43'N/88°02'W  
 53) San Pedro Sula 15°28'N/88°01'W

## El Paraíso

- 54) Guinope 13°51'N/86°55'W  
 55) Yuscarán 13°56'N/86°52'W

## Francisco Morazán

- 56) El Zamorano 14°00'N/87°02'W  
 57) La Flor Archaga 14°17'N/87°11'W  
 58) El Rosario, Parque Nacional La Tigra 14°13'N/87°05'W  
 59) Sabana Grande 13°50'N/87°15'W  
 60) San Juan de Flores 14°15'N/87°02'W  
 61) Talanga 14°28'N/87°06'W  
 62) Tegucigalpa 14°04'N/87°13'W  
 63) Valle de Angeles 14°09'N/87°03'W

## Gracias a Dios

- 64) Río Patuca 15°50'N/84°17'W

## Intibucá

- 65) La Esperanza 14°16'N/88°10'W  
 66) Quiraguira 14°22'N/87°55'W

## Islas de la Bahía

- 67) Isla de Roatán 16°23'N/86°30'W  
 68) Isla de Utila 16°06'N/86°56'W

## La Paz

- 69) La Paz 14°16'N/87°40'W  
 70) Muye 14°09'N/87°55'W  
 71) San José 14°13'N/87°56'W

## Lempira

- 72) Gracias 14°35'N/88°35'W  
 73) La Virtud 14°02'N/88°35'W

←  
 Fig. 1.—Distribution of localities in Guatemala, Belize, El Salvador, Honduras, Nicaragua, and northern Costa Rica. The numbers refer to those listed in the gazetteer.



Ocotepeque	
74) Belén Gualcho	14°29'N/88°47'W
75) Nueva Ocotepeque	14°26'N/89°11'W
Olancho	
76) Catacamas	14°53'N/85°55'W
77) Dulce Nombre de Culmi	15°09'N/85°37'W
78) Juticalpa	14°42'N/86°15'W
79) San José, Río Tinto	14°59'N/85°46'W
Santa Bárbara	
80) Ilama	15°04'N/88°13'W
81) Macholoa	14°52'N/88°16'W
82) Petoa	15°15'N/88°18'W
83) Quimistán	15°20'N/88°23'W
84) San Nicolás	14°54'N/88°19'W
85) Santa Bárbara	14°53'N/88°14'W
Valle	
86) Jicaro Galán	13°31'N/87°28'W
87) Nacaome	13°31'N/87°30'W
88) San Lorenzo	13°25'N/87°27'W
Yoro	
89) Yoro	15°09'N/87°07'W
<b>NICARAGUA</b>	
Chinandega	
90) El Realejo	12°32'N/87°10'W
91) Potosí	13°01'N/87°30'W
92) "Volcán de Casita"	12°42'N/86°58'W
Matagalpa	
93) Matagalpa	12°55'N/85°55'W
Río San Juan	
94) El Castillo	11°01'N/84°24'W
Rivas	
95) Cárdenas	11°12'N/85°31'W
Zelaya Norte	
96) Prinzapolka	13°24'N/83°34'W
97) Puerto Cabezas	14°02'N/83°23'W
Zelaya Sur	
98) Rama	12°09'N/84°15'W
Unspecified locality	
99) "Peña Blanca"	12°41'N/85°41'W
<b>COSTA RICA</b>	
Alajuela	
100) San Emilio	10°57'N/84°44'W
Guanacaste	
101) Peñas Blancas	11°13'N/85°38'W

#### ADDENDUM

Recent karyotypic data (Audet et al., 1993) confirmed the presence of a species distinct from *Rhogeessa tumida* in the Yucatan Peninsula region including northern Belize and Guatemala. The available name of *Rhogeessa aeneus* Goodwin, 1958 was assigned and is added to the bat faunal lists of Belize and Guatemala. The generic variability within the *R. tumida* "complex" over its entire range remains incompletely defined.

AUDET, D., M. D. ENGSTROM, AND M. B. FENTON. 1993. Morphology, karyology, and echolocation calls of *Rhogeessa* (Chiroptera: Vespertilionidae) from the Yucatan Peninsula. *Journal of Mammalogy*, 74(2):498-502.